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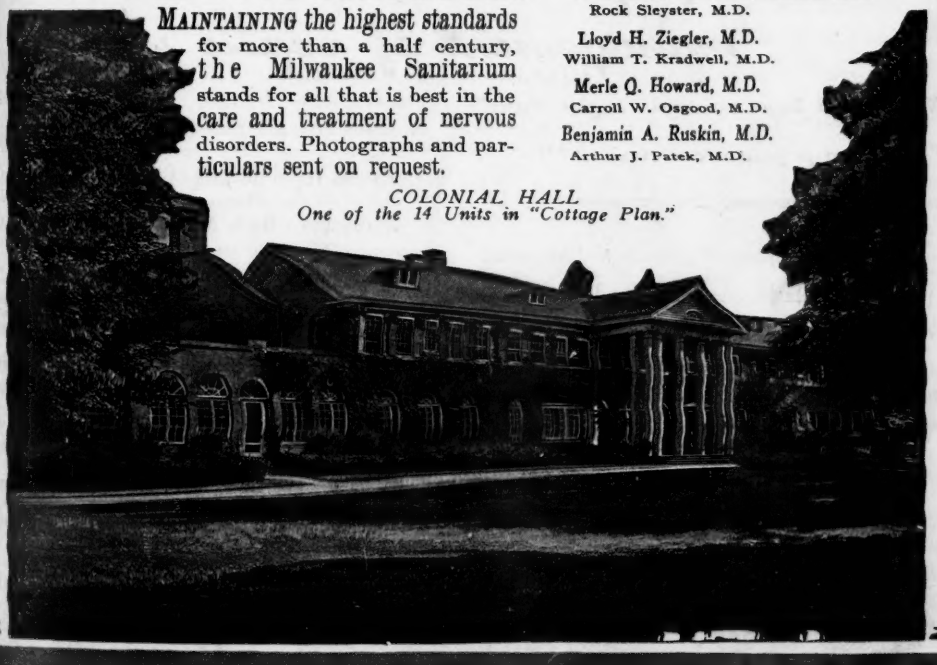

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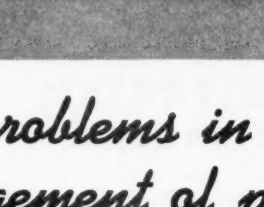

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The Illinois Medical Journal

November 1941

VOL. 80, NO. 5

Official Journal of the Illinois State Medical Society

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Editorials

POST GRADUATE CONFERENCES

Two years ago the present method of presenting post-graduate education throughout Illinois was adopted by the Post-Graduate Committee of the Illinois State Medical Society. During the 1940-1941 series they were very popular with the physicians, and nine such conferences were attended by approximately 1,500 doctors.

During the past summer the Committee held meetings after receiving suggestions from the component county medical societies, and then scheduled ten post-graduate conferences for the 1941-1942 series. The first of this series was presented on September 4, 1941 at Mt. Vernon, the second at Aurora on October 8th, the third at Lincoln on October 16th, the fourth at Moline on October 23rd, and the fifth at Danville on November 6th. These conferences have been well attended, and there was marked enthusiasm on the part of those present.

In most instances a noon-day luncheon with the compliments of the host county society, opened the proceedings. From three to five speakers were scheduled for the afternoon program, and in the late afternoon, an hour was devoted to round table discussions with each of the afternoon speakers appearing in separate rooms to answer questions on the subject which had been presented. This feature has been very popular, and the entire time allotment has been utilized to good advantage in each instance.

At several of the conferences a clinical hour was scheduled for the presentation of several unusual cases, whose histories and special examination reports had been recorded previously, then the diagnosis, differential diagnosis and recommendations for treatment were carefully outlined. Clinics on heart diseases, skin disorders, endocrine disturbances, and a few other popular subjects, have been presented at the Conferences.

Following the dinner the evening program was presented with one or two speakers scheduled for the session. Frequently an internist and a surgeon will be scheduled to present the medical and surgical aspects of some interesting subject, such as biliary tract disease, colitis, or other subjects having both medical and surgical aspects.

In several of the programs to be presented before the end of this year, a speaker from some Army service has been scheduled for a talk on medical services in the armed forces. These talks are proving to be quite popular.

In arranging the programs for these Conferences, the Committee first solicited the suggestions of the medical societies within the District to be served, so see what type of program they desired. With the Councilor for that district, they have selected the subjects and speakers, then the Committee has endeavored to make all the necessary arrangements. In this way, the physicians attending the conferences get the type of program they most desire. No registration fee is made as the Society bears all the expense of speakers, programs and postage.

Another interesting service in connection with these Post-Graduate Conferences which was started recently, has been most popular with those attending. For one dollar, mimeographed copies of the addresses given at all the Confer-

ences during the year will be mailed to those subscribing. This means from 50 to 60 complete papers on many subjects will be delivered at less than two cents each. An increasing percentage of those present at succeeding Conferences have been registering for this service, and requests have been received from physicians unable to attend, for copies of the talks to be mailed.

The Post Graduate Committee of the Illinois State Medical Society is desirous of giving the members the type of post-graduate service they most desire, and suggestions and criticisms are always solicited.

THE REHABILITATION PROGRAM

President Roosevelt recently announced that a plan is to be developed in the near future to rehabilitate many of those men who were turned down for military service. He gave the information that perhaps 200,000 of these men could be so rehabilitated that they could qualify for some type of military duty.

It is said that recently released statistics from the Selective Service Headquarters, show that approximately 1,000,000 men have been rejected on account of physical, mental or educational conditions. General Hershey, Director of Selective Service, gave the opinion that 200,000 of these men could be made fit for general military service as shown by reports from local draft boards. Under the plan suggested, the federal government will pay the costs for treatment by the local physicians.

The selective service report gave the principal causes for rejections as follows:

Dental defects	20.9%
Eye defects	13.7%
Cardio-vascular diseases	10.6%
Musculo sketetal defects	6.8%
Veneral diseases	6.3%
Mental and nervous diseases	6.3%
Hernia	6.2%
Defects of ears	4.6%
Defects of feet	4.0%
Pulmonary defects, including tuberculosis	2.9%
Miscellaneous	17.7%

In his press conference, when this release was

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given out, the President was asked by what authority the registrants could be compelled to undergo the rehabilitation medical and dental program. He replied that he had legal opinions as to how this could be made compulsory, although in his opinion, the majority of rejected draftees would be willing to have these defects remedied at the expense of the Government.

From the above statistics, it is obvious that more than one-third of the rejections are because of dental and eye defects, while more than 6% are due to venereal disease. It is possible for physicians and dentists to correct these conditions easily. Another 6% having hernias, can be rehabilitated by the surgeons. It is stated that approximately 100,000 draftees were rejected because of the lack of a fourth grade education.

It seems quite likely that within a short time, more information on this subject of rehabilitation will be forthcoming, and the role of the medical and dental professions in this program will be outlined.

RENAL FAILURE FOLLOWING BLOOD TRANSFUSION

The increased use of transfusion of blood has been attended by an increase in the number of complications which arise as a direct result of the procedure. Of all these the most serious and the most frequently fatal is massive infarction of the kidneys with free pigment liberated by destruction of the erythrocytes added to the circulation. This disaster has in the past been associated in the medical mind largely with those cases in which some error in grouping has resulted in the use of a grossly incompatible blood. There is, however, evidence to show that severe and even fatal renal failure may follow transfusions of blood in which incompatibility cannot be demonstrated by ordinary methods. Daniels, Leonard and Holtzman* record thirteen cases of severe renal insufficiency with seven deaths following blood transfusion, which have occurred in recent years in Washington hospitals. Of these patients all except one received blood from their own group and in only one case did subsequent re-checking show that the group was wrong. In several others the donor's cells were hæmolysed by the recipient's serum but only with the lapse of time or where special methods were used to demonstrate it. In several fatal cases detailed investigation failed to show any incompatibility of the bloods. All these patients progressed to a state of uræmia with nitrogen retention, and passed small amounts of dark urine loaded with pigment. Where post-mortem examinations have been made in cases such as these the lesion in the kidneys is striking and uniform; the renal tubules are choked with granular pigment derived from hæmoglobin; degeneration and necrosis of the tubular epithelium is present and the interstitial tissue is the site of an inflammatory leucocytic infiltration with œdema.

The problem in events such as this, which are by no means so uncommon as may be thought, resolves itself into a study of the factors which promote hæmolysis in shed blood. In some instances the lysis of the cells and the freeing of the hæmoglobin occurs before the blood is given; such is the case when hæmolysed blood from a bank is used or when hæmolysis results from excessive agitation of fresh citrated blood to prevent clotting. Temperature is an important factor; overheating can cause disintegration of the red cells and variations in temperature even though small in degree are dangerous. Cold blood can be given in perfect safety and it would seem likely that warming blood adds an extra hazard to transfusion.

When intravascular hæmolysis is considered the problem becomes more complicated. We assume that isohæmolysis is always preceded by isogglutination. Upon this hypothesis rests our present examinations for compatibility of blood by grouping and by cross-matching the donor's cells with the recipient's serum. It is possible that hæmolysis in some cases may occur without agglutination, and thus the ordinary methods of typing will not always prevent the transfusion of incompatible blood.

At present there is no call to alter laboratory methods to detect minor degrees of incompatibility; indeed, even if they were desirable, prolonged in vitro tests to determine compatibility could not be carried out prior to every transfusion. What is required is increased recognition of the hazards of transfusion, respect for which have waned with the perfection of technique. Just as in the case of any major surgical procedure and quite apart from the condition of the patient, every transfusion carries its own special risk. Most of the dangers are avoided by accurate blood grouping and careful attention to method. Outside this there still remains a small group in which serious ill effects will occur despite all precautions. These are a salutary reminder that transfusion should never be lightly undertaken and only after due and weighty consideration has been given to the indications in each individual case.

*The Journal of the American Medical Association, March 22, 1941.

LAW BARS ALIEN DOCTORS

Doctors who are citizens of countries which deny licenses to U. S. physicians are denied the privilege of entering private practice in California, under a new law in that State. Governor Culbert L. Olson's previous veto of the measure was overridden by both houses of the legislature. Canadian doctors and aliens already serving interneships here are not affected by the new legislation.

Correspondence

CHILDREN'S BUREAU NEEDS MATERNAL AND CHILD HEALTH SPECIALISTS

Employment registers are to be established by the Civil Service Commission to fill maternal and child health specialist positions in the Children's Bureau of the Department of Labor. Vacancies in similar positions in States agencies cooperating with the Children's Bureau may also be filled from these registers at the request of the States concerned. The examination announcement just issued by the Civil Service Commission to recruit persons for these positions which pay from $3,200 a year to $5,600 a year allows the filing of applications until *November 15, 1941.*

There are three options in which persons may qualify, — pediatrics, obstetrics, and orthopedics. For each of these options employment lists will be established for administrative, research, and clinical positions. The duties of the administrative positions include giving consultations and advisory service to State and other Government agencies carrying out maternal and child health programs. The research positions involve the planning or directing of studies in such fields as infant and maternal mortality, and child growth in relation to social, economic and other factors. Persons appointed to clinical positions will do clinical work in one of the options.

A written test will not be given for these positions. Competitors will be rated on their education, experience and corroborative evidence. Applicants must have graduated from a medical school of recognized standing with an M. D. degree and must have served a 1-year interneship. In addition they must have had full-time post-interneship clinical training as well as other appropriate experience in the option selected and in the type of work in which they seek appointment.

The Commission would deeply appreciate your assistance in bringing this examination to the attention of Doctors who may be interested in Government employment. A copy of the examination announcement is enclosed for your information. Persons who wish to apply for this examination should be advised that further information and application forms may be obtained from the Commission's representative at any first- or second-class post office or from the central office in Washington, D. C. However, if you wish to furnish the Commission with the names and addresses of possible applicants, we shall be glad to send them announcements and application forms.

UNITED STATES CIVIL SERVICE COMMISSION

OFFICE OF CIVILIAN DEFENSE

According to a joint statement issued on September 4 by the U. S. Director of the Office of Civilian Defense, F. H. LaGuardia, and the Chairman of the American National Red Cross, Norman H. Davis, State and local defense councils are the official agencies responsible for the coordination of all available resources which may be required for civilian protection in the event of belligerent action. Defense Councils should therefore acquaint themselves with the resources of the local Red Cross Chapters in providing food, clothing, shelter, nursing care, transportation, and other basic necessities and should integrate them into the comprehensive local program. Duplication of trained and experienced personnel and of available supplies of the Red Cross should be avoided except where supplementation is essential to meet the anticipated needs of the community.

NEW MEDICAL OFFICER EXAMINATION ANNOUNCED

Because of the critical need for Medical Officers in the Government, the Civil Service Commission has found it necessary to cancel the Medical Officer examination announced in August of 1940 and to issue another with certain modifications.

The principal changes in the new announce-

ment are: the adding of the option "Public health, general" to the Senior grade and the option "Cancer: (a) Research, (b) Diagnosis and Treatment" to the Medical Officer and Associate grade; the provision for the acceptance of applications for the Associate grade from persons who have not yet completed interneship; the setting back of the date of graduation for the Associate grade to May 1, 1930; and the raising of the age limit for ALL grades to FIFTY-THREE.

Further information may be obtained from the Commission's representative at any first- or second-class post office or from the Central Office at Washington, D. C.

NURSING POSITIONS OPEN IN PANAMA CANAL

Nurses are needed for work in the Panama Canal. The Civil Service Commission has just announced a special examination to recruit nurses for these jobs. No written test will be given and applications will be accepted at the Commission's Washington office until further public notice.

The entrance salary for nurses in the Panama Canal service is $168.75 a month with provision for promotions at stated intervals. A deduction of $40.00 a month is made for subsistence and quarters which are available for single women only. An additional 5% deduction is made toward a retirement annuity.

Appointments will be made to general staff duty and to psychiatric work. To qualify for general duty, applicants must have completed a three-year course in a school of nursing, and be registered as a graduate nurse. For psychiatric duty, applicants must have completed a three-year course in a school of nursing in a psychiatric hospital and be registered as a graduate nurse. However, nurses who have had a three-year general nursing course and have had one year of experience on the nursing staff of a psychiatric hospital may also qualify for psychiatric duty. Applications will be accepted from persons in their final year of training in a nursing school although they must submit proof of the completion of the training course and registration as a graduate nurse before they enter on duty. Applicants must not have passed their thirty-fifth birthday.

Further information and application forms may be obtained from the Commission's representative at any first- or second-class post office or from the central office direct in Washington, D. C.

TICK FACTS

Rocky Mountain Spotted Fever was first recognized in Kentucky in 1934. Since then a total of 21 cases of this disease have been reported to the State Department of Health. Five of these resulted in death. This is a fatality rate of about 25 percent, which is a much higher rate than is encountered in most infectious diseases. The number of cases reported annually varied from 1 to 7 during the period 1934 through 1940. These cases were all reported from counties within a radius of 75 miles of Louisville, most of them east and south of Louisville.

Persons exposed to ticks, such as campers, fishermen, picnickers and children playing on uncleared land, should be carefully examined for ticks at least once a day, preferably at bedtime. It is, therefore, recommended that during this period persons who are particularly exposed remove all clothing at the end of each day and inspect closely all parts of the body, especially those parts covered with hair, such as the back of the neck and under the arms. Ticks must have fed for from 4 to 6 hours before there is much danger of acquiring the infection. Hence, prompt removal of the insect is one of the most practical and effective means of preventing infection with the Rocky Mountain Spotted Fever virus. In this connection, it should be pointed out that all persons to whom ticks become attached do not develop Rocky Mountain Spotted Fever. In the most highly infected areas of the United States it has been found that only about one in each 300 ticks harbors the Rocky Mountain Spotted Fever germ. The only danger in the possession of a dog lies in the fact that it may bring the insects into the home. Dogs should, therefore, be inspected from time to time and any ticks removed with forceps, cotton or a piece of paper, without crushing the tick.

After a person has been bitten by an infected tick, there is a lapse of from 4 to 12 days before the actual onset of the disease. This onset comes suddenly — often with a chill, a rapid rise in temperature and a severe headache. The patient should immediately go to bed and call a doctor. About 3 to 4 days after the beginning of the fever an eruption appears, which is flat, pinkish in color, small and distinct, usually first noticed around the ankles and wrists. It may later appear over the entire body — on the face, soles of the feet and palms of the hands.—F. W. Caudill, M.D., *Commonwealth of Kentucky, Bulletin of Department of Health, June 1941.*

The risk of contracting tuberculosis from extrafamilial contact is greatest among school companions at the ages when resistance to the disease is lowest, namely, the "teen" ages; and among fellow workers, especially when the occupation is one which increases the risk of developing affections of the lungs. Report. Milbank Mem. Fund, 1928-40.

Medical Economics

Edited by R. K. Packard, M.D., Chairman of the Committee on Medical Economics of the Illinois State Medical Society, 826 East 61st Street, Chicago, Illinois.

The medical profession as a whole has long been interested in preserving our American way of life. There seems to be some difference of opinion, at the present time, of just what one means by our American way of life. Our conception of this has been, and still is, that we must preserve free enterprise and that this so called free enterprise must be honest, it must be efficient and it must establish the greatest good for the greatest number of our people. It encircles all of our political, industrial, physical, educational, religious and social problems. It is obviously a large order.

The one hundred and thirty million people who constitute our population cannot be made to think alike, act alike, work alike, assume responsibility alike or have the same inherent qualities of honesty, ethics and self determination. We cannot legislate changes in hereditary or biological tendencies. The single family unit cannot be controlled as evidenced by the various frictions that develop in a single family unit. Our national unit is only a multiplication of the problems of the family unit except that the development of a social state brings added problems. As a social state multiplies and grows and attempts to develop into a social, political and economic unit necessarily new and various problems arise out of such developments.

The function of all people and all governments should be to give the people a fair and honest opportunity to help themselves. If we are not able to help ourselves as individuals of the national unit then it seems obvious that our government cannot legislate us into security. Free enterprise has not been perfect, however, it has wide accomplishments to its credit as evidenced by our rapid growth and progress in all of the branches of our society. Just as individuals make mistakes in the conduct of their lives, their business or profession or whatever occupation they choose to pursue, so has free enterprise made such errors.

Government itself has been far from perfect.

Increased knowledge in the conduct of government and free enterprise should lead to the correction of such errors by thoughtful individuals. The question at the present seems to be whether we should recognize our errors and profit by them and set about to correct them and still maintain the principle of free enterprise or whether we should abandon to a large degree these principles and embark on a new program and new experiments, and assume that this new program and experiments will be more free from errors than our past record. Such experiments have been tried in various countries through various ages and the results are written on the pages of history both in the past and particularily at the present time.

The practice of medicine has operated for many years under the system of free enterprise, and its progress in this country cannot be questioned and its achievements are as free from error as any of our social, economic and political problems. The various government agencies have been of material aid in this progress and in these achievements. Regulatory laws are a necessity in medical practice just as they are essential in all of the other social and economic units of our state. Governments should always have regulatory controls but we should recognize that there is a wide difference between helpful and healthful regulations and regulations that are essentially confiscatory and destroy the democratic principle of free enterprise. We recognize the fact that in the intricate developments of our national unit, that progress coupled with

inventions and the development of our huge industrial machine, of necessity, bring new problems.

There has been a tendency in the past few years on the part of certain members of the medical profession and others to assume that there is an irresistable force in our country to change the general policy and principles of our American way of life. Many have felt that this force seemingly irresistable, that we should attempt to join with those who advocate changes and attempt to secure what we felt were the best changes possible under the new system.

The writer has sometimes acquiesced to this line of thinking but questions at the present time the soundness of such a philosophy for it seems evident that in our urgent desire to cooperate we are securing no further improvement than we would have perhaps secured otherwise.

It is difficult to reach a positive conclusion regarding this matter but it does seem that we at least should give serious consideration to the problem of making a valiant effort to fight for our conception of free enterprise and our conception of the American way of life.

The American Medical Association and its constituent societies are carrying on a valiant fight for the preservation of our present system of medical practice. In October 1939, the National Physicians Committee was organized to carry on a more extensive program not only for the preservation of our present system of medical practice but also for a continuation of free enterprise in general. The leading men of the medical profession have supported this organization, and it is the opinion of the writer that they are rendering a very valuable service not only to the medical profession but to the American people as a whole. I believe this organization should have the support of every individual physician in the state of Illinois because I think it is imperative that their work be continued.

Dr. R. K. Packard, Chairman
Committee on Medical Economics.

If the fire departments were to refuse to fight fires started by cigarettes not made in the home county, they would be no more ridiculous than are we when we refuse to fight tuberculosis in a person who has not lived long enough in one spot to establish legal residence. T. J. Werle, Health, May-June, 1941.

REPORT INFLAMMATORY ERUPTION OF SKIN FOLLOWING SULFATHIAZOLE TREATMENT

What they believe to be the first case of exfoliative dermatitis (a scaly inflammatory skin eruption) to follow sulfathiazole treatment is cited by Mary Weinstein, M.D., and Albert H. Domm, M.D., Philadelphia, in *The Journal of the American Medical Association* for August 23.

The patient was being treated for pneumonia when suddenly after eight hours of sulfathiazole treatment a profuse scaling rash with blisters developed. The drug was discontinued but the eruption became progressively worse until death five days later.

"Certainly," the authors warn, "the potential danger of sulfathiazole dermatitis [skin inflammation] should be kept in mind with the first appearance of cutaneous lesions. Withdrawal of the drug and forcing of fluids at the earliest sign of cutaneous manifestations constitute the safest procedures, although, as demonstrated in this case, the outcome may still be fatal."

TELEPHONE ETIQUETTE

As we respond to a 'phone call, the voice at the other end of the line is heard to say:

"This is Dr. X's secretary. Will you hold the line a minute. Dr. X wants to talk with you."

And then we wait a minute — or two minutes, — or possibly more.

This happens frequently to all of us. We doodle for a minute or two while busy Dr. X comes to the telephone after his secretary has made the contact. It would be more courteous if Dr. X had made the call himself, doodled for a little while waiting for us, and then greet us personally when we spoke into the receiver. It would have flattered us if he had assumed that we were as busy as he, or that our time was worth as much as his.

Relatively speaking, this is a small matter. How our telephone contacts are made will never change the course of history, but in a world in which courtesy is little thought of any more, it would be gracious to do the waiting on your end of the telephone line, rather than let a colleague's nerves become frayed while waiting for you at the other end of the line.— C. P. P. in *The Bulletin of The Columbus Academy of Medicine.*

Although a biological balance has apparently been turned against the tubercle bacillus, it is doubtful that the specific measures for its prevention have been in the main responsible. It is believed, however, that these specific measures can be made the dominant factor in the further decline of the death rate, and that if it be done intensively, the time when tuberculosis will cease to be an important medical and social problem can probably be reduced by one-half or more. Edward S. Godfrey, Jr., M.D., Amer. Rev. of Tuber., Jan., 1941.

Original Articles

THE MEDICAL DEPARTMENT OF OUR ARMY

COLONEL CHARLES G. HUTTER, Med. Corps
Liaison Officer U. S. Army, War Department and the American Medical Association

INTRODUCTORY

In the not distant past the Medical Department of the Army was, like the whole Army, simply organized. The demands for speed, human efficiency and technical knowledge were not so great then as they are now, and a simpler organization sufficed for furnishing medical service to combat troops. But with the enormous changes occasioned in civilian life and in the fighting forces during the past half century, the Medical Department of our Army had to adjust itself to the demands of modern methods of existence and warfare. The end of the increasingly complex requirements for dealing with an enemy are not yet in sight. As the products of man's cerebration tend to change his mode of living, so do they change his conduct of warfare.

"Bigger and better" was a quasi slogan formerly much more in evidence than today. The urge was for bigger and better cities, bigger and better business, bigger and better farms, bigger and better hospitals; in short, everything had to be bigger and better. Just as the bigger and better concept affected all groups, so it affected military organization. Now we have armies, the detailed organization of which is so complex that only personnel free from mental and physical defects can understand and adjust itself to the coordinated requirements of the modern hard-hitting, rapidly moving mechanized force.

The selection of men free from mental and physical defects that preclude their service with the armed forces is a duty of the Medical Department. Once the men are selected for service, it is the duty of the Medical Department to maintain them in "the pink of condition" so that the fighting strength of our Army will not suffer.

Read before Illinois State Medical Society Post-Graduate Conference, Aurora, October 8, 1941

ORGANIZATION

In the organization of our Army, the Medical Department is classed as a service. It is not a combat branch, though it accompanies and functions with combat troops. Personnel from the Medical Department is assigned to all units larger than a company, troops or battery, so that each individual soldier will obtain medical aid irrespective of the geographical location of the unit or the time of the day.

The Medical Department is charged with maintaining the health of the Army. Just how this is accomplished requires considerable knowledge of organization and a comprehensive understanding of the functions of the different arms and services. The army consist of branches such as the Infantry, the Cavalry, the Artillery, the Engineer Corps and the Air Corps, while the services consist of the Quartermaster Corps, the Judge Advocate General's Department, the Adjutant General's Department, the Finance Department, the Ordnance Department, the Signal Corps, the Inspector General's department, the Chaplain's Corps and the Medical Department.

The activities of all branches of the Army are so coordinated by the general staff that the special technical functions of each branch are balanced into an harmoniously acting whole. The detailed organization of the Medical Department cannot be considered at this time. However, I shall attempt to give you sufficient details of the arrangement to convey to you some idea of the acceptable methods of dealing with the innumerable problems that confront the medical officers in accomplishing their duties.

The Medical Department of our Army is headed by the Surgeon General of the Army.

He has an office in the War Department at Washington, D. C. His office has the following divisions, all for the purpose of maintaining the health of our Army: the Administrative Division, the Dental Division, the Finance and Supply Division, Inspection, Library, Nursing, Personnel, Plans and Training, Preventive Medicine, Hospitals and Professional Services, the Veterinary Division and the Division of Vital Statistics.

In personnel the Medical Department consists of the Medical Corps, the Dental Corps, the Veterinary Corps, the Nursing Corps, the Medical Administrative Corps, the Sanitary Corps (in time of war only), the enlisted men of the Medical Department and civilian employees.

To furnish adequate medical service to troops in the field, special units are organized. These units vary, according to the duties which they may have to perform, from regimental medical detachments, with their battalion or squadron medical sections, to Medical Battalions, Medical Regiments, Surgical Hospitals, Evacuation Hospitals, Convalescent Hospitals, Hospital Trains, General Hospitals and Medical Supply Depots. Some of these units are mobile to accompany troops wherever they may go, while others are fixed installations which can be moved only with difficulty after they are fully established. The mobile units are attached to the combat units which operate in the combat zone, while the fixed units are farther in the rear in the communication zone or in the zone of the interior.

As has been already mentioned, the mission of the Medical Department is to conserve and maintain the fighting strength of our personnel. This would not be a difficult assignment if the personnel remained more or less fixed and in a more or less compact group; but with combat units scattered about the globe from the arctic region to the equator, from the Eastern limits of our hemisphere to the Orient — often remaining but a few days at any particular location — the administrative and technical difficulties of furnishing medical service to all men of the Armed Force soon present themselves. Cognizance must always be had of the effects of epidemic and endemic diseases, exposure to the elements, fatigue, nostalgia, proper clothing and feeding; also hospitalization, transportation, medical supplies and the keeping of records pertaining to the sick and the injured.

DUTIES OF ALL OFFICERS

All commissioned officers, irrespective of branch, are charged with certain responsibilities. The Infantry officer, the Artillery officer and the Medical officer are charged with the same general responsibilities as are the officers of the Quartermaster Corps, the Air Corps or any other branch of the Army. All take the same oath of office, namely, to defend the Constitution of the United States against all enemies, foreign and domestic, and all are charged by the President with certain specific duties such as maintaining discipline. Administrative duties involving the preparation of records and reports, equipping, sheltering, feeding, transporting, paying and training personnel are but a few of the responsibilities of all officers.

MEDICAL OFFICERS

In general, the special duties of Medical officers is that of contributing to a fulfillment of the mission of the Medical Department.

Since all personnel of the Army is serviced by the Medical Department, one will find Medical Department personnel on duty wherever there are soldiers. If the units to which the soldiers belong are mobile units, then the Medical personnel of that unit will move with the unit wherever it goes.

MEDICAL OFFICERS AND COMBAT UNITS

The medical service with different combat branches varies somewhat, depending on the mobility of the unit, its mode of transportation, the kind of weapons with which it is equipped and its functional purpose.

The smallest combat unit with attached medical personnel is the battalion of infantry or artillery and the squadron of cavalry. These medical sections, each with two medical officers, are, for matters of training, under control of the Regimental Surgeon, whose rank is that of Major. The aggregate of the regimental medical personnel is known as the Regimental Medical Detachment.

MOBILE MEDICAL UNITS

Mobile medical units are assigned to units larger than a regiment, such as a division, a corps or an army. A medical regiment is assigned to each Infantry Division and each Corps. Each Army has four medical regiments. To the Triangular Division is assigned a medical Battalion, to the Armored Division a somewhat differently organized Medical Battalion and to the

Cavalry Division is assigned a medical squadron. These mobile medical units move with the units to which they are attached just as does the Regimental Medical Detachment when its regiment moves. Medical regiments and medical battalions operate between the battalion aid stations and the clearing station or hospital station, from the front to a distance of from 5 to 7 miles to the rear. Their function is principally one of evacuation, shock treatment, treatment of gas casualties, additional treatment of the wounded that is not possible at the battalion aid station and the distribution of medical supplies to the units of the division.

Each Corps has one Medical Regiment that serves the Corps Troop and operates within the area occupied by Corps Troops.

The Army with its four medical regiments has the function of evacuating casualties from the clearing or hospital station of the division to its evacuation hospitals. In addition to the four medical regiments and the evacuation hospitals, each army has attached Surgical hospitals and convalescent hospitals, all mobile. General Headquarters has for evacuation purposes hospital trains, hospital ships and ambulance planes. The hospital trains operate from the evacuation hospital to the general hospital through the regulating station. The ambulance planes may evacuate directly from the divisional area to the zone of the interior.

FIXED MEDICAL INSTALLATION

General hospitals are fixed medical installations. Several general hospitals with or without a convalescent camp form a hospital center. A hospital center ordinarily consisting of three general hospitals and one convalescent camp has a normal capacity of 4,000 patients and a maximum capacity of 8,000.

In addition to the mobile and fixed medical units just mentioned there are mobile and fixed medical supply depots. Furthermore, the veterinary service has an evacuating system organized similar to that for the evacuation of human casualties.

MEDICAL OFFICER REQUIREMENTS

For each thousand persons in the Army there are allowed six and one-half medical officers, making a total of 32,000 for an army of 4,000,000. This includes all medical officers, those serving with combat troops as well as those serving in hospitals. We have now an army of about 1,400,000, and with it we have on duty 1,200 regular Medical Corps Officers, 1,100 medical officers belonging to the National Guard and 7,900 Medical officers of the Organized Reserves. About half of the Medical Reserve Corps are already on extended active duty. According to the Protective Mobilization Plan the professional specialist requirements are as follows:

Type	Number in PMP	Ratio per 1,000,000 men.
Allergist	118	98.3
Anesthetist	325	270.8
Anesthetist (intratracheal)	33	27.5
Cardiologist	250	208.3
Laboratory specialists	782	651.6
Clinical pathologists, broad training in all specialties (239)		
Bacteriologists (105)		
Biochemists (168)		
Pathologists (163)		
Serologists (28)		
Epidemiologists and bacteriologist with general training (26)		
Parasitologist (9)		
Sanitary chemist and toxicologist (20)		
Medical entomologist (5)		
Veterinary laboratory-specialist (17)		
Dental laboratory specialist) (2)		
Dermatologist	118	98.3
Gastroenterologist	236	196.6
General operating surgeon	960	800
General operating surgeon, assistant	311	259.1
Internist	856	713.3
Neurologist	236	196.6
Neuropsychiatrist	231	192.5
Neurosurgeon	161	134.1
Ophthalmologist	121	100.8
Orthopedic surgeon	551	459.1
Otorhinolaryngologist	338	281.6
Plastic and maxillo-facial surgeons	164	136.0
Roentgenologist	418	348.3
Shock and intravenous therapy specialist	84	70.0
Thoracic surgeon	151	125.8
Tuberculosis specialist	118	98.3
Urologist and spyhilologist	352	293.3
Total number of specialists	6,914	5,761.6

These estimates are based on the units included in the Protective Mobilization Plan, 1940, Corps Area Service Command and War Department Overhead installations and includes those medical specialists specifically indicated in Tables of Organization (with the exception that the number of general hospitals used in this estimate was 102 instead of the 32 that is actually indicated in the PMP. In all cases, war strength is used. The number of hospitals included is based on the assumption that there will be battle casualties, and this estimate should not be used to cover the present training program. The total number of men under the PMP is 1,200,000.

During the present training period the Army has a normal bed capacity for 5 per cent of the command and an expansion capacity of 1 per cent. This makes available a total of six beds for every hundred men, or 84,000 beds for an army of 1,400,000. There are authorized sixty general hospitals of one thousand beds each,

thirty evacuation hospitals of seven hundred and fifty beds each and twenty-three surgical hospitals of eighty beds each. There are now organized forty-seven general hospitals, eighteen evacuation hospitals and seven surgical hospitals. In the theater of operations, beds are made available for 15 per cent casualties; these are in addition to the hospital beds in the zone of the interior.

As is well known, the Army conducts a sick call daily for all soldiers. It is at this time that soldiers should present themselves at the infirmary or hospital with their medical problems, real and imaginary. The medical officer examines each man, gives what treatment is indicated and marks the soldier "duty" or "hospital," depending on the findings. Many are marked "hospital" for trifling injuries or complaints because the status "quarters" is not conducive of good discipline. The soldier marked "quarters" is a responsibility of the Medical Department until he is marked "duty." The company commander cannot assign him duties and hence does not want him about the barracks. There is no status of "light duty" in the Army. This accounts for the admission to the hospital of many patients who would not ordinarily require hospital care and often irritates the highly trained, ambitious young physician who is restless to show his skill and accomplishments. To him I would say: "Be patient. Consider the purpose of the Medical Department, for its efficiency is not judged by the number of soldiers hospitalized but by the noneffective rate." At present the noneffective rate in our Army is lower than was expected. This commendatory state of health in our Army reflects the high quality of professional services furnished our troops.

TRAINING

Now that the training of our greatly enlarged Army is well advanced, the time has arrived for us to apply all of our knowledge and energy to further medical service to troops in the large training camps and to those in the field.

I shall deal with only three basic principles involved in furnishing medical service to troops: the mission of the medical department, the training of medical department personnel and the ultimate test of efficiency, combat.

Simple as the mission of the Medical Department appears, the preservation of the fighting strength of our soldiers is not always simple. Indeed, the mission is often made complex because of a lack of appreciation of the means at our disposal for accomplishing our task. With a thorough knowledge of the tools available we should not become confused in doing our job, difficult as it may at times seem. Without training we cannot acquire knowledge or visualize our goal; nor can we apply the proper tool to a given situation for achievement of that most desirable of mass activities, teamwork. When all speak the same language and all understand one another, there will be little talk and much work.

Military knowledge consists of three elements: technical, tactical and administrative.

Technical Knowledge. About one third of a military medico's armamentarium is acquired prior to his entry into the Army. With a diploma from an accredited school, a certificate of internship from an accredited hospital and a license to practice medicine, the technical training should be almost complete. Nevertheless, environmental difficulties often necessitate substitute methods for the orthodox. As Dr. de Tarnowsky so aptly stated, a medical officer does what he can, when he can, with what tools he has at hand.

Although newly commissioned physicians are often reluctant to forego the pleasures of applying their professional skill, nevertheless it is imperative that they become versed in tactics and administration. Quite true, no physician desires to hang his hard earned professional ability in cold storage when he is assigned to duty with troops, and, indeed, it is not contemplated that he should permit his professional qualifications to go sour while actively engaged with the armed forces. However, he must know something about the different elements of the group with which he is to serve and live, for then, and then only, can he function effectively as professional aid and adviser. He must acquire the common knowledge of all Army officers and thereby fit himself for the higher responsibilities of leadership.

Tactics. — Tactical knowledge is acquired best by performing duty with troops. We have at Carlisle, Pa., the Medical Field Service School for instruction in administration and tactics, but not all officers are so fortunate as to be detailed to this school. Tactics deal with the organization and function of the different arms and services. It considers their size, their equipment,

their ability to move and their employment in combat.

Tactics of the Infantry are different from those of the Artillery or Cavalry, and so the tactics of the mobile medical units are different from the tactics of any other service. In the fixed medical units like general hospitals, tactical knowledge is not so important but the demands on administrative ability are greater.

Administration. — Administrative ability, also learned best on active duty, at service schools, is of great importance to officers in the higher grades. These officers when placed in command will find themselves responsible for many of the details involving shelter, food, clothing, equipment, supplies, properly accounting records and disciplinary control. As a knowledge of tactics is more important than administration in combat units, so administration is more important than tactics in fixed installations. Administration should be a subject of great interest to those officers who aspire to high rank.

COMBAT

Combat is the ultimate test of the strength and efficiency of our troops. Once engaged in combat it is too late to think of training or practicing tactical maneuvers. Combat is action of a most violent sort. It may change quickly from offensive to defensive, from holding to moving, from orderliness to almost helpless confusion. In World War I combat stagnated into trench warfare; but the present European war with its rapidly moving panzer divisions, dive bombers and heavy tanks has demonstrated to us a form of combat depending on the "break through" and the immediate and uninterrupted follow-up with thorough exploitation of every advantage gained. Once a major attack is launched there is no stopping until the objective has been reached. When teamwork is perfect, victory will be ours.

TOTAL WARFARE

Modern war is total war. This means not alone that the armed forces engage the enemy but that the entire population must contribute to the effort. Furthermore, civilian populations are as exposed to the destruction wrought by far flung explosives as are the combat troops. Needless to say, total war makes extraordinary demands on the medical profession. Not only must the profession supply the troops with adequate medical service, but it must assume additional responsibilities in maintaining the health of the civilian population; hence there has been organized a Committee on Medical Preparedness.

PREVENTIVE MEDICINE

One of the requirements of all medical officers is a thorough knowledge of preventive medicine. It is not enough to know the dangers of communicable diseases to a community and the advantages of isolation of patients afflicted with these diseases; it is essential to know how they are transmitted, the vector involved, the reservoir, seasonal variation and the immunological factors. Furthermore, it is essential to know the needs of the soldier to maintain his effectiveness. Here the medical officer must always be on the alert to detect improper feeding, unnecessary exposure and improper protection against the elements. The personal hygiene of the individual soldier and his environmental sanitation are the responsibilities of the medical officer at all times. He must report sanitary hazards to his superior immediately, frequently appending his recommendations for correction of the defects. Although line officers are frequently excellent sanitarians, their duties are too involved to permit delving in the details of preventive medicine. When, however, the medical officer makes recommendations for the correction of sanitary defects, immediate action will be taken by the commanding officer.

Soldiers are of an age group with low morbidity and mortality rate. To determine their freedom from disease and disability, they are given a thorough physical examination before they are accepted for service. Immediately after being sworn in they are vaccinated against smallpox, inoculated against typhoid fever, immunized against tetanus and, depending on geographical service, protected against yellow fever and other diseases against which protection is possible.

Kitchens, mess halls, quarters and latrines should be inspected daily. Food handlers must be examined periodically to determine freedom from transmissible diseases and parasites. Barbers are also examined periodically, and their shops must be operated in accordance with Army Regulations.

To prevent introduction of communicable diseases and parasites and to check on the personal hygiene of soldiers, thorough physical inspections are made monthly. At these inspec-

tions note is made of the cleanliness of clothing (outer and under); evidence of disease, infection, injury, proper nourishment, venereal diseases, foot troubles and ill fitting or unserviceable shoes.

In the absence of a veterinarian, it often becomes the duty of the medical officer to inspect meat and meat products. Here the medical officer must again show his versatility, for the eating of spoiled beef, pork, fish, fowl or other foods will quickly deplete an organization of effectives.

Just as spoiled food is a danger to good health, so are impure air, polluted water and a dirty environment. Constant supervision must be exercised to have regulations pertaining to ventilation enforced, and in the field daily checks must be made on drinking water.

Soldiers travel about the countryside in a wide circle when on pass. They eat wherever they happen to be when they are hungry, and alcoholic drinks often so affect their inhibitions that they become easy prey to the painted "ladies."

Preventable diseases are never tolerated in our Army. We find them, of course, but it is the duty of the medical officer to be constantly on the alert concerning their presence and to be sufficiently active to make immediate and correct recommendations for their control.

MEDICAL PREPAREDNESS

Medical preparedness is but a part of a vast general preparedness program of the whole nation, albeit an extremely important part of that larger program. In considering the effectiveness of our medical preparedness for a major emergency, we must consider in detail not only the number of physicians of the nation and their distribution but their ages, their specialties, their physical condition and, perhaps, their administrative qualifications.

By the application of increasingly higher self-imposed standards of preparation and practice, circumscribed chiefly by the limits of science and fair dealings, the medical profession has endeavored and continues to hold itself prepared to cope with the health problems of the nation. Because the medical profession possesses the knowledge and the ability to attend to our health problems, it is but good common sense to hang the responsibilities of a nation's health squarely on the shoulders of the profession. Should the profession show reluctance at assuming their responsibility, or even procrastinate, then there is grave danger of medicine falling from its laboriously reached scientific heights and tumbling back into the dismal pit of empyricism, charlatanry, quackery or worse.

There are about 180,000 physicians in our country at the present time. Not all the 180,000 are actively engaged in practice. In the total, male, female, old, young, desirable and undesirable are included. With a normal annual attrition of about 4,500 and a graduation of about 5,200 for replacement and service for the 800,000 to 900,000 annual increments in our population, no surplus of physicians is being produced.

The Medical Preparedness Program involves:

1. A knowledge of the number, nature, location and availability of present medical services and facilities.

2. A knowledge of the maintenance of the standards of quality of services regardless of the individuals or groups to whom it is furnished.

3. Facilities for the conduct of research.

4. Arrangements for the maintenance of teaching institutions.

5. A comprehensive knowledge of the health and medical requirements of the civilian population.

6. An understanding of the health and medical requirements of the armed forces.

7. A definite understanding of the requirements necessary to maintain a qualified medical profession to provide medical care for the armed forces and the civil population.

As our national defense progresses, additional demands not thought of will be made on the profession. We already have the demands of the Selective Service and the proposals of our National Youth Administration, our Control of Syphilis program, the Office of Civilian Defense and rehabilitation. But with proper planning and a continuing supply of graduates from our institutions of learning, I feel certain that the medical profession of our country will again, as on many previous occasions, win the everlasting praise and respect of our fellow citizens.

COMMON SENSE IN THE PRACTICE OF MEDICINE

Chairman's Address

Section on Medicine, One Hundred-First Annual Meeting, Illinois State Medical Society, Chicago, Illinois, May 21, 1941.

WILLARD O. THOMPSON, M.D
CHICAGO

In all fields of human endeavor the most important thing is good judgment — a rather rare quality. A man may have an entertaining personality and a constant flow of new ideas and yet be very erratic, unpredictable and undesirable because of lack of common sense. Good judgment depends upon inherited and environmental factors. Important among the inherited factors are the quality of the cerebral cortex and the stability of the nervous system as a whole: and among the environmental factors, good training and hard work. Experience must be constantly broadened by the frequent facing and solution of new problems.

Advances in medicine are taking place so rapidly that it becomes very important to know when a new idea is worth anything. It is only 17 years since I graduated in medicine and yet so great has been the change that were I to attempt to practice medicine knowing only what I was taught at that time, I should be hopelessly out of date. During my days as a medical student the use of insulin in diabetes and of iodine in toxic goiter were first announced. Since then have come advances in every branch of medicine and particularly in the field of vitamin deficiencies including the chemistry and synthesis of various vitamins, in our knowledge of the endocrine glands and in the extraction, identification and synthesis of the hormones which they produce, and more recently, in the development of chemical agents effective in a variety of infections. With this increase in our knowledge has come the necessity for carrying out numerous laboratory procedures for purposes of diagnosis and for following the course of treatment and yet not a single one of them is any substitute for good clinical judgment. So many ideas are put forth and so many procedures advocated that later prove to be of no value, that it is well to preserve an attitude of wholesome skepticism toward everything. This does not mean that one should question only the new but that he should question both the old and the new. It used to be that things were so because Galen said that they were so: but this point of view has long since disappeared and most of us, I hope, now think a little for ourselves.

As a medical student I was taught that diets low in protein and salt were valuable in the treatment of essential hypertension and chronic nephritis. In recent years data have been presented which suggest that inadequate amounts of protein in the diet actually disturb the nutrition of the kidney and one would indeed be very outmoded if he were to prescribe a low protein diet at the present time for a patient with essential hypertension. Within the past few years two procedures have gained some acceptance that to the man with common sense would seem open to question. Goldblatt showed that as a result of ischemia a substance was produced in the kidney which raised the blood pressure. This was a very important observation but a variety of investigators began going too far in their clinical application of this finding. A search was made for a damaged kidney in patients with essential hypertension and in occasional instances patients were cured by the removal of such a kidney: but as time has gone on and evidence has accumulated, it has become increasingly apparent that only rarely can damage to a kidney be demonstrated in patients with this disease. Sympathectomies have also been somewhat in vogue in certain quarters for the treatment of essential hypertension. If the patient is not cured the surgeon wonders if the sympathectomy has been extensive enough. To be sure, we have learned a great deal about the physiology of the sympathetic nervous system but I rather suspect that the results are such that if you and I had essential hypertension we should like to keep our sympathetic nervous systems intact.

Speaking about diets reminds me of the diagnosis frequently made of spastic colitis or irritable colon. I was rather appalled when one of my friends in another hospital informed me that owing to the unfortunate dietary habits associated with civilization, 95 per cent of the population suffered from irritability of the colon, which could be cured by a bland diet. I had been under the impression that the symptom complex covered by this diagnosis was attributable in most instances to a disturbance of the

From the Department of Medicine, Rush Medical College of the University of Chicago and the Presbyterian Hospital.

sympathetic nervous system. In this connection, I shall always remember the man about 45 years old who sat down in a doctor's office one Saturday afternoon and began relating in great detail his history which seemed to concern primarily his gastro-intestinal tract. A diagnosis of irritable colon had been made elsewhere and over a period of several years his diet had been more and more restricted. He had lost about 50 pounds in weight. When he was asked "How do you feel now?", he answered in a very serious voice, as if he were about to die, "I feel terrible." When asked if he were hungry, he said "Doctor, I get so hungry at times I don't know what to do." After a careful study of the patient from every point of view failed to reveal any organic disease, he was given a high caloric diet which contained a liberal amount of fresh fruit and green vegetables. He thrived on this regimen but periodically, for a period of from 1 to 4 days, would have some abdominal distress, nausea and vomiting, with or without headache. These attacks would come and go regardless of the type of food he ate before or during the attack. A diagnosis of intestinal migraine was made. Dietary restriction was not necessary.

With the increase in our laboratory facilities there is a tendency for some physicians to order many laboratory tests which they are not qualified to interpret. To interpret a laboratory result intelligently it is necessary to have some acquaintance with the procedure involved and particularly with the errors inherent in it. One afternoon a nose and throat man called an internist to say that some blood was being sent out to his laboratory for analysis. The doctor consulted wanted to know what the trouble was and was informed that the patient had otosclerosis. He then wanted to know what laboratory tests were particularly desired and was informed by the nose and throat man that the latter did not know but was groping around for something. All he wanted was a blood chemistry and an internist would surely know what to do better than he did. Unless one knows how to interpret laboratory results it is better not to rely on them and furthermore one should bear in mind that the value of the result depends on the accuracy with which it is obtained. It is only after much bitter experience that we learn to discard all questionable results. It has been very aptly said "God forbid that we should practice medicine by machines alone."

There never has and never will be any substitute for a careful history and physical examination. We must be doctors first and specialists afterward if we would avoid overlooking many important facts. When a very nervous woman recently consulted me about a goiter, I should have been a very poor doctor indeed if I had not noticed that she appeared to be very much disturbed about something although her pulse rate was normal. She was loathe to talk at first but a little questioning brought out the fact that her nervousness dated from the time that her husband, of whom she was very fond, had told her that he was very handsome, could get any woman he wanted and would like a divorce. Her basal metabolism was normal. To be sure, she had an adenomatous goiter but it was not the cause of her trouble.

Foci of infection were very much in vogue when I was studying medicine, although I must say in support of my instructors that they showed unusual conservatism about the matter for the times in which they were living. Teeth, tonsils and gall bladders disappeared like snow before the sun. Even the colon came in for its share of surgical attention. As time went on, it became more and more apparent that only in occasional instances did foci of infection bear a causative relationship to disease. Women still had their arthritis after all possible foci of infection had been removed: and chorea and rheumatic fever were found to be just as frequent in children who had tonsillectomies as in those who did not. Yet the notion still persists that whenever there is any doubt about the cause of any disorder, it is good practice to remove the tonsils and any devitalized teeth in any event. A woman with acromegaly whom I saw recently had her tonsils out twice within four years because of a little spur on her left os calcis. The pain in her heel and the great capacity of the lymphoid tissue in her tonsils to regenerate were both undoubtedly related to overproduction of growth factor by the anterior lobe of her pituitary. Some years ago a man with retrobulbar neuritis had his tonsils and adenoids and some devitalized teeth removed, only to discover in later years that his retrobulbar neuritis was part of the symptom complex of multiple sclerosis, the progress of which certainly was not affected by the removal of his supposed foci of infection.

There is fortunately developing a spirit of closer cooperation between the physician and the surgeon and the realization that except in emergencies, the operative procedure itself is only an incident in the treatment of the patient. Taking it for granted that the surgical skill is of high quality, the most important thing in determining the outcome of operations is the preoperative preparation of the patient. The postoperative care is also of importance but not as much as the preoperative condition. The great importance of adequate preoperative preparation is well shown in the reduction in mortality in surgery of the thyroid and gall bladder. Indeed a thyroidectomy is never an emergency procedure and a crisis in the postoperative period almost always means inadequate preoperative preparation. The first question that should be constantly asked whenever the problem of surgical intervention presents itself in any diseased state is not *"How* should this operation be done?" but "Should it be done *at all,* and if so, *when?"* Surgical procedures should be resorted to only when it is clear that carrying them out will improve the condition of the patient or that they offer the only hope that the patient has of surviving. A decision to operate should be made only after the most careful study of the patient. The danger of jumping at conclusions is very well illustrated by the case of the busy surgeon who decided to do an appendectomy because a patient had some tenderness over McBurney's point and some nausea and vomiting. The patient's wife was greatly impressed by the fact that he could, by merely looking at the patient, decide what the difficulty was and do something about it at once. The surgeon, on the other hand, was not sufficiently impressed by the fact that the patient had a temperature of 104° F. and a leukopenia. Unfortunately, at the time of operation, he did not realize the significance of congestion and enlargement of the lymph follicles in the terminal ileum. The patient did not tolerate the operation very well but managed to survive. Two weeks afterward his temperature was still 104° F., he still had a leukopenia and it was apparent to both the surgeon and the patient's wife that all was not well. The physician who had looked after the patient for some years was finally consulted and made a diagnosis of typhoid fever, which was confirmed by various laboratory procedures. The patient survived after a very stormy course which was complicated by rupture of his appendix incision about 3 weeks after he had been operated on. This resulted in a ventral hernia which had to be repaired at a later date. This patient is of course, not the first one with typhoid fever to be operated on for appendicitis and there is, indeed, some justification at times for having difficulty in distinguishing between the two diseases. In this instance it would seem that if more time had been taken to make a careful study, needless surgery would have been avoided and perhaps the course of the disease would have been less severe. There are times when it is necessary to make decisions quickly but in most instances decisions made in haste are apt to be repented at leisure.

Rest is probably one of the most important therapeutic agents and yet it is greatly overdone in some clinics. For example, in preparing a patient with toxic goiter for operation, it is very unwise to keep the patient confined completely to bed unless he is decompensated or in a crisis. Complete bed rest produces loss of muscle tone and loss of muscle tone increases the risk of operation. Rest has also been greatly overdone in the treatment of certain cardiac disorders. In many instances in which complete rest has been the order of the day, it is coming to be realized that the heart muscle does better if it is made to do some additional work, never forcing it, of course, to the limit of its capacity.

There is an old idea that when you do not know what to do, you must do something. Nothing could be further from the truth. When you do not know what to do, do nothing rather than do something for the mere sake of activity. Let me illustrate this by the difficulties of a certain inexperienced intern who had the care of a woman following a thyroidectomy for exophthalmic goiter. The patient was in unusually good condition at the time of operation. Her basal metabolism and pulse rate had dropped to within normal limits. She had gained weight. When her pulse rate rose to 120 following operation, he did not know that this was a common occurrence and proceeded to digitalize her. Digitalis was continued until she developed a complete heart block. Although she was not vomiting, he thought he should administer some fluid parenterally on general principles. The patient unfortunately had some reaction from the fluid which caused her temperature to rise to 105° F.

As a result of this intern's desire to do something without waiting to study the situation thoroughly and to procure the knowledge in which he was lacking, a postoperative course that might have been uneventful, became a very unpleasant one.

Hormones and vitamins seem to be very popular nowadays. The average person who eats a well balanced diet and gets his share of sunshine does not need to worry much about vitamin deficiencies. However, one would not think this to be the case from reading the advertisements. To prescribe glandular products intelligently requires a very precise knowledge of the glands of internal secretion. The advances in this field have been so great that it is difficult for the average physician to keep informed even about what the various glandular products are, let alone what they will do. Consequently, we witness a great deal of useless polyglandular therapy, undertaken in the blind hope that one of the elements may hit the mark. Recently, while discussing the treatment of hypogonadism, a physician was extolling the virtues of testosterone propionate. When he had finished, the doctor to whom he was talking said "Say, doc, what about this stuff 'test-aw'-sterone?" Is that any good?"

Many very potent products are now available with which we can literally produce modern miracles. For example, we can produce sexual maturity in men and women who are completely undeveloped sexually. We can restore patients with Addison's disease to good health and keep them alive. Nothing is more remarkable than to observe the development of the flat breasts of the sexually immature woman in her twenties, to watch her infantile uterus assume the proportions of the normal adult uterus, to note the increase in weight and the deposition of fat in the characteristic feminine areas and to see childish emotional reactions replaced by those of the normal adult. This becomes all the more intriguing when we realize that these changes can be produced by a substance prepared synthetically in a chemical laboratory. But in spite of the many excellent products that are now available, there are also many of questionable value that are still being rather extensively used. For example, there is not a single anterior pituitary preparation on the market at the present time that is very effective in routine clinical practice.

With the great advances that are being made in medicine, it is necessary to preserve an open mind and to change our ideas frequently, but we must never be carried away by overenthusiasm or accept things without adequate evidence. When we do not know, we should say so and enlist the aid of people who do. With increasing knowledge and experience one will, if he is stable, acquire good judgment and will be able to tell when a procedure appears to offer some promise and when it does not. A good physician considers only the welfare of his patient and will subject him only to those therapeutic and operative procedures which will help him.

SURGERY OF THE AGED

E. LEE STROHL, M.D.
CHICAGO

Bailey has aptly stated that "within the past twenty-five years, pediatrics has been elevated from a more or less interesting fad to a highly developed and economically important specialty." Thewlis says, "the aged gradually grow economically worthless and must remain so, while the child has a prospective and ever increasing economic value." Pediatrics has merited the efforts of its pioneer advocates and the praise it receives as a potential saviour of future races.

In sad contrast is the lack of progress in the development and improved care and understanding of the problems of the aged. Some advances have been made and can be noted when the life expectancy tables of today are compared with those of ninety years ago. In 1850 the life expectancy in this country was thirty-nine years; in 1931 it was fifty-nine years. Brooks stated that in 1850, 600,000 persons or 2.6 per cent of the people of the United States were more than 65 years of age. In 1900, 3,080,000 or 4.1 per cent, and in 1941, 9,000,000 or 6.8 per cent were more than 65 years of age. If the present trends continue, 22,000,000 persons or more than 14 per cent of the population will exceed 65 years of age by 1970. It is obvious that with the increase of individuals past 65 years of age the incidence of surgical lesions likewise will have increased. As lesions which should and must be treated surg-

From the Departments of Surgery, University of Illinois College of Medicine and St. Luke's Hospital.
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ically develop in many individuals 65 years and over, attention is drawn to the value of careful analysis of the effects of surgical lesions and the risks of operation in patients in these age groups.

My interest in this subject dates from boyhood. My paternal grandfather, 70 years of age, had been denied surgery for an incarcerated inguinal hernia notwithstanding his otherwise excellent health. At 72, however, he was operated on successfully for this lesion and lived to carry on an active life until he was 79 years of age. The common axiom, "he is too old for operation" on many occasions is an excuse for avoiding surgery, yet people have lived sixty-five years and over because there was nothing radically wrong with kidneys, heart, lungs and liver. A dissipated ne'er-do-well of thirty-five years is a much greater surgical risk than the well preserved patriarch of eighty. Surgery of the middle age furthermore is differentiated from that of advanced age and yet the chronological age of the patient is accepted as an excuse to delay or withhold operative treatment to relieve dangerous or disabling diseases, a large percentage of which are amenable to safe interference.

A shift in population will affect medical economics. By necessity there will be an increase in the number of physicians and institutions. Furthermore, a redistribution of physicians will be necessary when more of our elderly patients settle in the South. At the present time the chance of dying of cancer is one in nine for white males and one in seven for while females. It is believed, furthermore, that the number of patients with cancer may nearly double within the next twenty-five years because of the shift of population structure.

The Committee on Population Problems in 1930 reported 12,000,000 children under five years of age and 6,500,000 adults past 65. By consulting Table I, it is readily seen that by 1970 there will be approximately 22,000,000 adults over sixty-five and, because the birth rate since 1900 has dropped more than one-third, there will be 6,500,000 children under five years of age. It seems obvious, therefore, that geriatrics should approach pediatrics in its importance.

The visit to older patients should never be hurried; rather it should be casual as though he were being honored. It also should be one of pleasure and since old people live on memories, it is well to discuss events of common interest rather than to discuss the condition at hand. Many times an optimistic note, for instance an evening at dinner in their home, will give them something to anticipate.

Upon admission to the hospital the personnel should be instructed to alter the patient's usual routine as little as possible. With any sign of pessimism as to prognosis shown by the personnel the morale of these patients immediately drops. By explaining their problems to them as accurately as is advisable their outlook immediatly becomes optimistic. Another important point is that the surgeon in charge should explain to these patients the results of the pre-operative examinations and what is to be done at operation. As these people by virtue of their age have become accustomed to suggesting to other persons what should be done, it flatters them to know that things are being done for them.

TABLE I

TABLE (DUBLIN AND LOTKA) AGE COMPOSITION OF THE POPULATION OBSERVED FOR 1850, 1900 AND 1930; AND CALCULATED FOR 1950 AND 1970

Year	Total Population (Millions)	Under 20 yrs. (Millions)	Ages 20-49 yrs. (Millions)	Ages 50-64 yrs. (Millions)	Ages 65 and over (Millions)
1850	23.2	12.1	8.9	1.4	0.6
1900	76.0	33.7	32.0	7.1	3.1
1930	122.8	47.6	54.0	14.4	6.6
1950	138.3	40.1	63.2	22.4	12.5
1970	151.4	40.6	59.8	28.6	22.4

N.B.: Average age of U. S. population —
In 1940 — 28.9 years
In 1900 — 22.9 years

When surgery is necessary in the aged prolonged bed rest and sudden change of environment by an abrupt curtailment of previous habits should be avoided. Probably because of the feeling that most of his life lies behind him, the older patient has fewer worries than the active business man of younger years and accepts operation with more tranquility and resignation when in the proper frame of mind.

The criteria for surgery in these aged people is as follows:

1. Is surgery essential to save the patient's life?

2. Will operation remove the physical disability and rehabilitate the patient to his more or less normal status?

3. Will it affect a cure of a malignant disease? These matters should be weighed carefully in view of the physical status of the patients under consideration.

In a general survey the following factors should be considered. First, an estimate should be made of the cardiac reserve. LeRoy states it must be assumed that a patient past 65 has at least a Grade II heart disease. Any patient, therefore, who is to have surgery should have a careful cardiac study including electrocardiographic tracings and roentgenological studies of the chest. More information may be gathered from a careful clinical study than from all the laboratory procedures now available. A good rule of thumb for such patients is whether or not they can walk with ease around the block.

In choosing cardiovascular patients for surgery Willius' criteria are (1) the degree and extent of cardiovascular damage, (2) the degree of cardiac restoration possible by treatment, and (3) the prognosis with regard to life expectancy.

Many of these patients have chronic bronchitis and bronchiectasis which mitigate against surgical procedures. These should be estimated as accurately as possible in view of the type of anesthetic to be employed and the extent of the operation necessary to effect a cure. More will be said on this point under "Anesthesia."

The wear and tear of years has produced a certain amount of liver damage in these patients. This need not be a deterrent to operation if proper pre-operative studies are carried out. Complications following cholecystitis in the aged are very poorly tolerated, and postponing surgery because of age alone is to be condemned.

The genito-urinary system should be carefully analyzed. Many of these patients have a low grade prostatic obstruction which will become an immediate postoperative problem, and it is well to anticipate this before surgery. Many times a long standing nephritis which is subclinical will be revealed in the pre-operative studies and measures may be directed to the correction of this condition before subjecting the patient to operation.

These patients should have a routine blood chemistry examination including studies of the urea nitrogen, non-protein nitrogen, chlorides, carbon dioxide combining power, and plasma protein determination. This information often will elicit a silent nephritis, liver damage or low kidney reserve which has been present for a number of months or years. The plasma protein often is low in patients of this age group because of their altered eating habits due to changes in dentures. The protein intake consequently is usually low. These complications determined beforehand should be corrected and the blood chemistry placed in as nearly normal balance as is possible by intravenous fluids, blood transfusions, vitamin therapy and adequate diet.

Pre-operative medication should be minimal and opiates are better used sparingly. We do not give large doses of opiates to elderly patients because they act as depressants to the vital organs.

An anesthetic should be chosen which will have the least deleterious effect on the patient but which at the same time will be adequate for the anticipated operation. Frequently the method of choice involves a combination of two or more agents, any one of which used alone would be inadequate. The patient will cooperate poorly when given an anesthetic that he fears, and for this reason the anesthetic to be used should be discussed with the patient. For this group of patients we prefer to use regional block supplemented by inhallation gas anesthesia, because it affords less damage to the already altered physiology and with the cooperation of the patient gives adequate relaxation. If the patient's hemoglobin is less than 50 per cent spinal anesthesia should not be used.

Because old people react adversely to long-continued annoyances it is better to avoid multiple stage operations. Patients subjected to colostomy many times gradually will decline because of the chronic nuisance they have to endure. A woman of 71 years, for instance, with a carcinoma of the splenic flexure had a one stage resection with an ileostomy of the Witzel type. She was out of bed on the fourth postoperative day and left the hospital on the eighteenth day.

At the time of surgery older patients shock more subtly and are much more difficult to treat therefore, whereas young people shock quickly but respond to shock therapy more promptly. Measures should be taken to prevent shock, therefore, by administering intravenous fluids, blood transfusions and other methods. We have found that suprarenal cortical extract given to elderly patients before and after operation will aid in preventing shock as well as to buffer the strain on the vital organs by freeing the fluids in the tissues. This helps in keeping the blood electrolytes in balance.

Often transfusions are given to aged patients

who are not actually in need of blood to prevent possible shock. The blood should be given slowly.

An operative procedure should be chosen which renders the most likelihood of success from the point of view of cure as well as morbidity. The basic principles in surgery of this group are *timely, cautious, humane surgery.*

Immediately postoperative the patient should be given oxygen for ten minutes and should have hyperventilation with a carbon dioxide-oxygen mixture every hour for the first twenty-four hours. The cardiac output is increased thereby and the heart muscle is spared as much as possible. This is also a prophylactic treatment for pulmonary complications which these patients are most prone to develop. At no time is pitressin given because it produces coronary spasm (LeRoy).

Fluids should be used most judiciously. Murphy and his co-workers have said that regardless of the state of compensation in a diseased heart fluids must be given slowly, in small volume, and preferably in the form of isotonic solution. For this reason immediate fluid intake is not of primary concern and it is probably well that these patients undergo a certain amount of dehydration since old people tolerate starvation and dehydration well. The danger of excess fluid far outweighs that of inadequacy for a period of two or three days postoperative. Many times pneumonia is brought about by the injudicious use of intravenous fluids. Fluids given rapidly to a patient whom we must assume has Grade II heart disease may lead to the development of moisture in the lungs and subsequent pneumonia.

Postoperatively, these patients are somewhat of a problem as to just how much they should be allowed to move about, to have visitors and to become adjusted to their preoperative status. If possible, as soon as the danger of secondary shock is past, these patients should be encouraged to move about freely in bed, sit up in bed, and be up in a chair on the second, third or fourth day. A Balkan frame and a trapeze attached over the bed allows more freedom of use and motion of the extremities. It is, furthermore, prophylactic treatment for pulmonary complications.

Members of the family should call upon the aged patient at an early hour postoperatively. The danger of excitement is minimal and is offset by a definite feeling of optimism created in the patient.

TABLE II.
INCIDENCE OF SURGERY

Hospital	Year	Total Major Operations	Patients over 65	Per cent of Total	No. died postoperative	Mortality per cent
St. Lukes'	1940	2221	97	4.36	18	18.3
Univ. of Chicago Billings	1939	2012	162	8.05	21	12.9
	1940	1975	155	7.85	20	12.9
Univ. of Michigan Hospital Ann Arbor	1935 to 1940	16624	2415*	14.52	479	19.83

*These statistics are for patients of 60 and over.

An analysis of the mortality rate in aged surgical patients is shown in Table II. It can be seen that approximately ten per cent of all patients submitted to surgery are in this age group. The table does not include figures on transurethral prostatectomy and closed reduction of fractures.

SUMMARY

Because of the shifting population, creating more aged people in this country, a different attitude is being forced upon us in regard to surgery of the aged.

A charitable attitude is one of choice. Because the variation in the type of lesion from clinical and laboratory surveys may lead to a bad prognosis and denial of surgery in the aged, we feel it is best to offer these patients something constructive in the form of surgery.

We believe that a judicious choice will lessen the hazard of operation in this age group. The chronological age must never be a criterion as to the prospect of surviving the surgical procedure.

The factors which account for better surgical results in the aged group are a better understanding of physiology and physiological chemistry, the proper choice of anesthesia, and development of surgical technic. I should like to stress again the basic principles of timely, cautious, humane surgery.

122 S. Michigan Avenue

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OPHTHALMOLOGY UNDER FIELD CONDITIONS

ROLAND I. PRITIKIN, M.D.

CHICAGO

Major, Medical Corps, 33rd Division, Army of the United States

Faculty — Loyola University, School of Medicine

Staff — Mercy Hospital, Illinois Eye and Ear Infirmary

(The opinions expressed in this paper represent the views of the author, and are not to be construed as representing those of the Surgeon-General or the Medical Department of the Army).

The mission of the ophthalmological service of a field force is the preservation and care of the eyes of the personnel composing the forces in the field. The Chief Surgeon of a field force numbers among his consultants an ophthalmologist. Although a formal ophthalmological service is provided for in higher commands only, all lower medical units provide primary first aid treatment to eye injuries. The ophthalomologist does his part in carrying out the general mission of the medical department, which consists of contributing to the success of military operations, by the application of technical knowledge to conserve man-power and to prevent adverse effects upon combat efficiency. To be more specific, the responsibilities consist of first, the recommendation of measures to protect troops from eye injuries and disease, second, recommendations as to procedure in the care of eye injuries, third, supervision of eye hygiene in collaboration with other medical officers, fourth, the procurement of ophthalmological equipment and supplies, fifth, the keeping of proper records for future use, and sixth, making recommendations for the training of medical department personnel in the care of eye injuries.

In a modern army the visual requirements are strict; the visual hazards greater than in former years. The man who drives the tank or truck must see well. He is required to have 20/100ths vision without glasses, correctible to 20/40 in each eye, although waivers may be granted some. In addition to below minimum visual acuity there are many other causes for rejection. Trachoma, chronic conjunctivitis, keratitis, corneal ulcers, corneal cicatrices and opacities, and staphyloma if sufficient to reduce vision below the standard; xerophthalmia, extensive pterygium, ectropion, entropion, lagophthalmus, ptosis, trichiasis, blepharospasm, chronic blepharitis, epiphora, chronic dacryocystitis, or lachrymal fistula are all causes for rejection. To these may be added irregularities in the form of the iris, synechiae sufficient to reduce visual acuity below the standard, progressive cataract, coloboma of the choroid or iris, absence of the pigment layer, glaucoma, iritis, extensive or progressive choroiditis, retinitis, detachment of the retina, neuroretinitis, optic neuritis, or atrophy of the optic nerve. Additional causes for rejection are nystagmus, exophthalmus, well marked strabismus, nyctalopia, diplopia, asthenopia accompanying any ocular defect, malignant tumors of the lids or eyeballs, or abnormal conditions of the eyes due to diseases of the brain.

An ophthalmological estimate of the situation must be made in an area occupied by an army. The prevalence of trachoma or other infectious diseases must be ascertained and preventive measures instituted. In dusty areas, routine measures for the prevention and treatment of dust conjunctivitis must be instituted. The care and operation of motor vehicles constitute an eye hazard to those so employed. Men must be taught how to guard their eyes when working about motors and other machinery. The use of protective goggles when working in machine shops should be insisted upon.

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Treatment of eye injuries whether due to motor accidents, working with tools, or when due to war projectiles are handled as follows: — First aid to the injured eye is given on the spot by the soldier himself, or the nearest available medical department man. This usually consists of bandaging, utilizing the bandages that every soldier carries in his first aid packet. The first medical officer to see the patient will examine the eye, make a diagnosis, elaborate on the first aid treatment, and evacuate the patient to a clearing station. From the clearing station he will be removed to an evacuation hospital, and from there to a convalescent hospital or a general hospital, each of which has an ophthalmologist.

Both the chief surgeon of a field force, and the chief surgeon of a communications zone are aided by a staff called the consultant section. The consultant section has in its surgical subsection an ophthalmologist. Corps, divisions, and smaller units do not have an ophthalmologist in their tables of organization. The activities of the ophthalmologist are coordinated with those of other consultants in the medical section of the Army Surgeon's headquarters.

Eye patients requiring hospitalization are given temporary treatment at the clearing station, and then transferred further to the rear. The ophthalmologist will have personnel of the medical department and of the army nurse corps to help him at the various hospitals. It will be his duty to properly instruct them in procedures to be followed in the care of eye patients.

The ophthalmological equipment for a battalion or a regiment consist of a number of spuds and similar equipment for the removal of foreign bodies, boric acid, sodium bicarbonate, and argyrol solutions for the treatment of conjunctivitis, and eye bandages or pads. For a division or similar unit, each clearing company in a medical regiment, or medical battalion has a supplemental instrument set for eye injuries. Convalescent hospitals and general hospitals in the communications zone are completely equipped for ophthalmologic care and treatment.

In the theater of operations the ophthalmologist has two problems. The first is the matter of preventive treatment. If military operations are conducted in an area where trachoma is prevalent, troops must be guarded against coming in contact with infected individuals. Dust conjunctivitis is frequently noted in areas in which the top soil is poor and the earth is covered with a fine layer of dust that gets into the nose, throat and conjunctival sac, producing a conjunctivitis in a large number of individuals. Rest, boric acid washes and warm applications will result in rapid improvement in a few hours in most cases.

The second problem is that of battle casualties in which there are injuries of the eye or its adnexa due either to projectiles or gas. Those injured by projectiles are given first aid as described above and evacuated to the rear. Gas casualties consist of several types depending on the gas used. The lacrimators that might be used are chloracetophenone, brombenzlcyanide, or tear gas solution consisting of CNPS* and chloroform. The lacrimators are not dangerous to life but cause copious tearing and intense, though temporary, eye pains. Washing with sodium bicarbonate or boric acid solution and exposure to fresh air is the treatment. The more dangerous gases are the vesicants, which produce inflammation, burns, and destruction of tissue. They consist of mustard gas, lewisite, and ethyldichlorarsine. Immediate washing of the eyes with boric acid or sodium bicarbonate solution is the first aid treatment.

No greater opportunity exists for caring for large numbers of eye patients under field conditions than in the Orient. The movies which I have the privilege of showing depict the work in the eye clinic at Shikarpur, Sind, India, which we had the good fortune to attend as a visiting eye surgeon during the 1939 season. During the period of six weeks, when the hospital is open each year, 6000 patients were seen, and 2500 operations were performed of which 1200 were for cataract. Shikarpur is a native city of about 70,000, in the Sind Desert of northwest India. Here during a six week period each winter come thousands of eye patients — many traveling as far as 500 miles, by train, bullock cart, camel, and even on foot. The city is a former caravan and trade center covering about a square mile. Sanitation is unknown, and in the bazaar food is displayed in close proximity to open sewers. Nearly all the inhabitants of Shikarpur are Hindus, but the mud-hovelled, mud-walled villages of the surrounding country-

*CN — symbol for cholarcetophenone.
*PS — symbol for chlorpicrin

side are people by Mohammedans. Most of them are poor tenant farmers, and they present a picturesque sight as they come to the clinic in their bright colored rags, with their wives, children, dogs, goats and bullocks trooping after them. Nor must I forget the "hookah," or large family pipe, and the earrings, nose rings, bracelets, and anklets which the women wear. The older men have long white beards, and large mustaches, frequently dyed red with henna. The hospital building consists of one small structure of four rooms. An admitting room in which two hundred patients can be seated at one time, either on the benches or on the floor; a treatment room for the postoperative ambulatory patients, where eye medication and refraction are performed, and two operating rooms. Each operating room has two rough wooden tables on which the patients are placed. An electric or gasoline light is held over the eye by an assistant. Cutting instruments are kept in pans of alcohol, and the other instruments in pans of constantly boiling water, being removed from their position over the kerosene stoves only during the few minutes that they are in actual use for each operation. Patients are kept in a large compound, consisting of evenly spaced brick pillars, over which canopies of cloth or mats are placed as protection against the rain. They lie on mats or on the native rope beds called "charpais." One relative is permitted to stay with and nurse each patient, and both nurse and patient are fed during the hospitalization period. Boiled rice is the main dish. The prevalence of eye diseases in this area is due to the poor vitamin content of the food, and the unhygienic conditions under which the people live. Perhaps too, the glaring rays of the sun are a factor.

The mornings work starts early, and consists of dressing the bed patients and examining the new patients. Operations begin at about ten in the morning, and continue until all patients are cared for. One day, 150 operations were performed, these included 92 cataract cases, and we did not finish until 7:00 o'clock in the evening.

In the matter of pre-operative preparation, experience has shown that conjunctivitis, dacryocystitis, and pyorrhea are contra-indications to cataract extraction. On the other hand, trachoma, unaccompanied by purulent conjunctivitis is not dangerous. All these types are thoroughly irrigated with 1:2000 mercury bichloride solution immediately prior to surgery, and the contents of the Meibomian glands are thoroughly squeezed out. The operative results have not been worse with trachomatous patients.

A glaucomatous eye with cataract is handled as follows: — Broad iridectomy, followed by cataract extraction at a later date. In performing the iridectomy, the knife is inserted 1mm. temporal to the limbus along the temporal superior portion of the cornea, and the adjacent conjunctiva on the nasal side. The knife is not carried through the conjunctiva until the fluid of the anterior chamber has formed a bleb under the conjunctiva. This reduces the speed with which the fluid of the anterior chamber leaves. In a glaucomatous eye, the lens may be dislocated if the anterior chamber fluid escapes too rapidly. After the bleb is formed the knife is passed through and the limbus section is completed. A slight amount of counter pressure on the sclera, superior to the site of incision causes the iris to bulge, which is then grasped with an iris forceps. First one limb is cut, and then the other, so that a wide opening may result.

Anesthesia consists of cocaine solution 4%, instilled three times at five minute intervals. The method of akinesia, in which the area about the Geniculate ganglion is infiltrated by 2 c.c. of 2% Pantocaine is used. In very refractory patients, chloroform is used. The extra-capsular extraction is performed in one-eyed patients, patients of the ple thoric type, i.e. patients with bulging, large eyes, and in patients with glaucomatous cataract. Cases of extra-capsular extraction are dressed for the first time on the third day, and those of the intracapsular extraction type, on the fifth day. Uncomplicated cases are discharged on the tenth day.

A significant fact for the military surgeon is that in spite of the tremendous volume of patients handled under primitive conditions, the number of cases turning out badly is no greater than those cared for under the most ideal conditions. This demonstrates that, if the technique is properly adjusted to field service and the administrative, supply and personnel features are organized accordingly, excellent results may be obtained, even in the delicate procedures involved in eye surgery.

DISCUSSION

Dr. E. M. Hartlett, Evanston: This has been a very interesting paper from many angles. I am glad the experience in India was shown and discussed, because it illustrates a very important part of the practice of ophthalmology under field conditions. Major Pritikin spoke in brief of some of the eye requirements in the present selective service. It might be interesting to note, although he made no point of it, that color perception or rather the lack of color perception is not a cause for rejection. There has been mention in the press concerning the use of color blind or red and green blind cases in certain observation groups. So far as I have been able to asertain no such selection has been made in these groups.

The difference in the eye requirements now and in the last war is that while in each case 20/100 is required for each eye, in the 1917-18 requirements it was only required that one eye be correctible to 20/40; whereas at present 20/40 aided vision in each eye is required. It is not required that the draftee have glasses. He merely must have that potential eyesight — unaided vision correctible to 20/40 in each eye. It does not make any difference how long one studies the Tables of Organization of the army, standards change over night. We are now learning about stream line divisions. The old hospital station (division hospital or field hospital) of which there were three in a hospital battalion, no longer exists under that name. The hospital entity is included in a new name, the clearing battalion: three companies, each of which includes some functions of the hospital. I mention that because Major Pritikin, in tracing the casualty from the front line back to the hospital did not mention the hospital facilities — he mentioned only the clearing station.

I think the time element is important. One would like to know how soon an eye injury gets attention. We can only conjecture about this but it is fairly accurate. An eye injury would probably walk to the battalion aid station, which he could reach in from two to five minutes, and there be attended by a medical officer. Atropine was not mentioned in the list given by Major Pritikin, but there must be atropine in the battalion aid station so that it can be instilled in perforating injuries and injuries to the cornea. This casualty having reached the battalion aid station would next walk or be transported by litter to the clearing station about an hour later. The clearing station, probably as in the old set up, would go forward and set up collecting stations to which would walk or be borne by litter the casualties to be picked up by ambulance and transported back to clearing stations under tents, and he would receive a little more detailed eye attention.

Major Pritikin's experience in India where eye surgery is done with crude and primitive hospitalization illustrates very well what can be accomplished by ophthalmic practice under field conditions in time of war.

Dr. R. I. Pritikin, Chicago (closing): I want to thank Dr. Hartlett for his discussion, and to say that I enjoyed coming before this Section to present this paper.

DIABETES FROM A SURGICAL STANDPOINT

GUY S. VAN ALSTYNE, M.D.
CHICAGO

I have been asked to present a twenty minute paper on "Diabetes from a Surgical Standpoint." I choose to interpret this as meaning: "Surgery in the presence of diabetes," rather than: "The surgical treatment of diabetes." Although much experimental work has been done on the latter, little of practical value has been evolved. On the other hand the former has made enormous strides since Banting and Best gave insulin to humanity. Now surgery upon the diabetic, while still not as safe, other factors being equal, as upon the non-diabetic, has been made so relatively safe that a diabetic need never be denied necessary surgical treatment. The surgery is usually far safer than is the threat of the surgical condition left untreated.

Prior to the advent of insulin in 1921, only the direst emergencies in diabetics received surgical treatment, and in these the mortality was from 40 to 80 per cent. Even these figures do not include the "sins of omission"; deaths because surgery was denied the diabetics which would have saved their non-diabetic brothers. Since insulin has made it possible for the internist to manage and control diabetes, the surgical mortality in diabetes has dropped to as low as 3.3 per cent.[1] Frank N. Allen, writing on "Surgery and Diabetes" in Surgical Clinics of North America,[2] says: "The increased risk is at present not due directly to diabetes but rather to the fact that individuals who have diabetes are likely to be less favorable candidates for operation than the average. The majority are elderly people. Many have degenerative changes in the cardiovascular system. Grave surgical conditions such as carcinoma and gangrene of the extremities are encountered. These factors must be considered in evaluating surgical risk. Fortunately, the danger of coma, the low resistance to infection, and the poor vitality of tissues due to lack of control of diabetes can be eliminated by adequate treatment." McKittrick eval-

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uates the risk in gangrene as follows: "The gangrene patient entering the New England Deaconess Hospital with diabetes and gangrene may be described as a man or a woman 64.4 years of age, with diabetes of 8.6 years duration. If a major amputation becomes necessary, he or she faces a mortality of about 14 per cent. If successful, he has one chance in five to return within two years for amputation of the other leg, and an even chance to be dead in three years"[3]. Stanbro[4] says that 31 per cent of diabetics over 60 years of age have gangrene.

Pathological lesions in the diabetic are those of the non-diabetic, plus especially, lesions of the skin due to the excess of sugar in it and lesions of the lower extremities due to circulatory deficiencies. It has been shown that skin infections are much more common in uncontrolled diabetes than in normal individuals. Such lesions as folliculitis, furunculosis, carbuncle, and phlegmons are produced by glycophilic organisms which of course find pabulum favoring their rapid growth in diabetic skin. Arteriosclerosis occurs in diabetics ten years earlier than in non-diabetics. Some authors claim that no one can have diabetes over five years, even though it is under control, without having arterio-sclerosis. From then on it is rapidly progressive. Because of deficient blood supply from this cause, we find the following lesions common, especially in the lower extremities: decubitus ulcers, infections under calluses, local osteomyelitis of phalanges and metatarsal heads, local areas of dry gangrene from occlusion of small arteries, and finally that most feared of all, a moist and rapidly spreading gangrene with secondary gas bacillus infection.

I can think of no condition in which absolute cooperation between hospital departments is more imperative than in the surgical care of the diabetic. Not only must the internist and surgeon pull together in perfect harmony but the anaesthetist, pathologist, dietitian and nurse are all exceedingly important cogs in the machinery which must be set in motion as soon as surgery is contemplated. Should any one of these fall short of his or her duty, death of the patient could well be the penalty.

In emergency surgery: acute appendicitis, perforated ulcer, acute intestinal strangulations, empyema of the gall bladder; nothing is gained and much can be lost by an undue wait for conditioning of the patient. When a surgical emergency is suspected, an internist should be called at once. He can evaluate urine findings and an "emergency" blood sugar determination sufficiently accurately to prescribe proper doses of glucose and insulin for the immediate needs of the patient, while preparations for surgical treatment are being carried out.

Surgery of election presents a much different aspect. There is no need for haste. As with the non-diabetic, the general condition of the patient can be weighed against the dangers of the contemplated surgery. If surgery is decided upon, the internist will probably forbid it until something like the following plan has been followed:

Feed sufficient carbohydrates (at least 150 gm.) to store up a reserve of glycogen in the liver. Await a sugar free urine. There must be a total absence of acidosis, determined by an absence of acetone and diacetic acid in the urine and a normal CO_2 combining power with the blood plasma (55 to 75 volumes per cent); adequate salts and fluid reserve, and a blood sugar within normal limits. However, it is better to have the blood sugar a little high, with a slight "spill" over into the urine, than to institute surgery in the presence of a hypoglycemia with its attendant risk of coma.

The choice of an anaesthetic agent or agents will be governed by factors common to all surgery: the type and length of operation, the skill of the surgeon, the equipment of the hospital, and the general condition of the patient. In addition to these criteria the various anaesthetics have a rather definite scale of safety in diabetes. Chloroform and Avertin are almost universally condemned because of their known toxicity to liver cells. F. P. Coleman says that Avertin produces more hepatic damage than all other commonly used anaesthetics[5]. Ether is listed next, although it is admitted by many operators that it is essential that it be added not infrequently to the gases to avoid anoxemia, as well as to promote better relaxation and so expedite the surgery. The gases come next, nitrous oxide, ethylene, and cyclopropane, probably in this order. Wilcox and Tonell state that cyclopropane does not damage the liver[6]. Local, regional, and spinal are listed as the safest anaesthetics to be used in diabetic subjects, although it is emphasized that local infiltration should certainly not be used in infected areas nor in regions where there is deficient blood supply, lest the

edema further impair the circulation. One reason given for their safety is that vomiting is less likely to follow their use than with inhalation anaesthetics, and vomiting, with its resultant acidosis predisposes to coma. Vomiting, however varies so greatly with different individuals, and even with the same individual under different circumstances that this argument has only relative value. I used local infiltration and regional block in performing appendectomy upon a patient with a known gastric ulcer, hoping there-by to avoid post operative vomiting. She vomited almost continuously for the first eighteen hours. I took nitrous oxide for five minutes early one morning on an empty stomach while a paronychia was lanced and vomited the balance of the day. Another time after a full breakfast of orange juice, cereal, ham and eggs, toast and coffee, I took the same anaesthetic for twenty minutes, had no nausea or vomiting post-operatively and ate a steak dinner that evening.

Surgical treatment in diabetes is comparable to surgical treatment in the presence of any other untoward complication or associated condition. I have seen acute appendicitis in the height of scarlet fever and measles; in all trimesters of pregnancy; in lobar pneumonia; in tiny infants; and in the senile. What did I do about it? Lord Moynihan said that no patient should be permitted to die of one disease merely because he happens to have another. By this same token, I ignored the complication and operated in each case for the appendicitis. We need not ignore the diabetes because now it can be managed, but we must not allow it to deter us from giving adequate surgical care to these people when surgery is indicated.

Joslin says that one in two or three of all diabetics developes surgical lesions. Other writers put this figure as high as fifty per cent.

One of George Ade's fables ended with these words: "This fable teaches that 'haste makes waste,' and 'delays are dangerous'." This is about the position in which the abdominal surgeon may find himself when a diabetic presents symptoms of acute intra-abdominal disease. On one hand, an impending diabetic coma with its attendant severe acidosis may exhibit nausea, vomiting, fever, leucocytosis (one author reported 80,000), tenderness, and even abdominal rigidity. One must then wait a reasonable time, for in this condition all symptoms and findings disappear when the proper amounts of glucose and insulin are administered. On the other hand, however, one must not procrastinate too long because intra-abdominal gangrenous processes, such as gangrene of the appendix or the gall bladder, progress much more rapidly in the diabetic than in the non-diabetic.

Of the many lesions of general surgery which the diabetic, in common with the non-diabetic, is heir to, biliary tract disease and thyrotoxicosis demand special mention. Biliary tract disease because of the grave danger of hepatic insufficiency which can be tolerated less well by the diabetic, and thyrotoxicosis because of its close metabolic relationship to diabetes. There should be no putting off of surgical treatment of cholelithiasis or of hyperthyroidism.

Prophylaxis against the lesions common to diabetes, already named: infections and gangrene, should be emphasized. First, rigid control, by the internist of all diabetics at all times. (If this could be, there would be little need to add more here). Then absolute cleanliness of the skin, including vigorous treatment of such affections as "athletes foot"; the wearing of properly fitting shoes; proper warmth of the lower extremities, especially in cold weather; scrupulous avoidance of wrinkles in stockings or shoe linings, gravel or protruding nails in shoes; the avoidance of high heels in women; in fact the avoidance of any and all local irritants which can produce lesions in tissues whose resistance is already lowered by arteriosclerosis, and, in uncontrolled diabetics, by excess sugar in the skin.

The lesions most commonly encountered are, first, infections of the skin, and second, two types of affections of the feet; one in which infection is primary, followed by local necrosis, and the other with primary loss of blood supply followed by secondary infection.

Of the skin infections, the one which probably carries with it the greatest threat to the life of the patient is carbuncle. Fortunately, since its mortality ranges from 25 to 60 per cent, these are uncommon, even in diabetics. It was in regard to the treatment of carbuncle, that I encountered the only divergence of opinion among present day authorities. While most authors insisted upon radical and early surgery, excisions, crucial incisions, with or without excision of the infected material from the under

surfaces of the flaps, Walters and his associates state, speaking of carbuncle: "At the present time in cases of diabetes we are avoiding operation entirely[1]." I have followed this plan now for many years in treating carbuncles in non-diabetics with excellent results and no mortality, but since I have been so fortunate as not to have encountered any in diabetics, I cannot speak personally with authority on the subject.

The lesions of the feet in which infection is primary do well under conservative treatment. These consist largely of osteomyelitis of a phalanx under an infected corn and perforating ulcers under calluses. These patients have definite arterio-sclerosis but still have good pulsation in the popliteal, dorsalis pedis, and posterior tibial arteries, and even show a good capillary pulse in the tips of the toes and under the nails. Corns form over the "knuckles" of the toes, impairing the circulation there. In addition to this, flexing of the toes, especially if the shoes are too short, tends to increase the ischemia at the knuckle. The result is that the corn breaks down, and becomes infected. Soon a small perforating ulcer appears. A small probe passed into this perforation will detect bare bone, even before it will show in an X-ray. The treatment is local removal of the toe, leaving the wound open for drainage. I have one patient, a woman in her seventies, for whom I have amputated, at four different times, three toes from one foot and one from the other, each followed by healing. An internist has always managed the diabetes. The other common lesion of this variety, is the perforating ulcer which is found under a callus, as Walters[1] points out, usually under the distal heads of the second, third, and fourth metatarsals because of a fallen transverse arch. I have at present one patient, a man in his seventies, who has had two catastrophies which started in just this way. The first time he presented himself was with a broken down callus in this region, with a perforation extending only to the plantar fascia, but with infection, swelling, fever, leucocytosis and with a grossly neglected diabetes: acetone and diacetic acid in the urine, with blood sugar at 461.9. The diabetes was, after some difficulty, brought under control by the internist, and his plantar fascia, which became gradually and progressively gangrenous, was removed little by little and day by day, until it was entirely cut away and the patient had an incision which extended from the ball of his foot to his heel and undermined to the lateral borders. During this process the second and third toes manifested local osteomyelitis so were removed along with the heads of their respective metatarsals. He made a slow but satisfactory recovery. Over a year later he appeared with a second perforation under a callus in the same region with osteomyelitis of the distal end of one of these metatarsals. His diabetes was again found out of control. Proper management and removal of the necrotic portion of the bone brought about prompt healing. I stress these examples to emphasize the fact that these cases are not subjects for radical amputations but that they will do well under careful diabetic management plus local surgery.

The last variety is the frank moist gangrene which strikes with a true blitz-krieg. A toe, or a portion of a foot is blue, cold, and swollen, the blood supply is gone, secondary infection rapidly sets in, not infrequently the gas bacillus is present, the patient becomes acutely ill with sepsis, the gangrene is rapidly spreading, a foul, stinking, putrid, semi-liquid mass. Of course major amputation is indicated. The site of amputation will vary with the condition of the individual patient and with the experience of the surgeon. With a good popliteal pulsation, and a healthy skin, one might be tempted to amputate at the "site of election" below the knee; without these findings one would probably amputate with greater safety above the knee; partial amputations of feet in these cases are distinctly contra-indicated.

Most complications following surgery in the presence of properly controlled diabetes are due, not to the diabetes itself but are those common to the age of the patient. Healing will be delayed only in uncontrolled diabetes. If, for example, healing is poor on an amputation stump of a controlled diabetic, then it is due to poor circulation in the skin because of the existing arteriosclerosis, granting, of course, that the site of amputation was wisely selected. A frequent complication of lesions of the feet in diabetics is anaesthesia. This can lead often to disaster. One patient who had a perforated ulcer at the base of the toes and for whom I had ordered hot boric dressings, somehow disengaged his foot from the dressings and brought it into direct contact with an electric pad with three

third degree burns resulting. One opened into the metatarsal-phalageal joint of the great toe and was much longer getting well than the original lesion. I amputated the head of a metatarsal bone through an existing open wound, by simply biting it off with a bone forceps with the patient in bed in his room and under no anaesthesia. He was totally unaware of what I was doing and felt no pain. The entire plantar fascia was removed piece meal, from the patient mentioned previously, while he was in bed and with the exception of a couple of momentary twinges, without pain.

Infection occurring in diabetics sets up a vicious cycle; it diminishes carbohydrate tolerance; then hyperglycemia, in turn, favors the spread of infection. On the other hand there is a sudden and marked increase in carbohydrate tolerance following the removal of a mass of infective material such as a carbuncle, a gangrenous leg, or the draining of a large abscess, so beware of a sudden post-operative hypoglycemia. In fact for the first three or four post-operative days it is safer to err on the side of hyperglycemia rather than to brave the dangers of a possible insulin shock.

I do not agree with Rynearson[7] when he says, speaking of post-operative care: "There must be no division of responsibility; all orders regarding the care of the patient should be given by the medical service." Instead I believe that during the post-operative period, and for so long as the case is "surgical" there should still be the smooth and thorough cooperation which I advocated in the pre-operative preparation, between surgeon and internist. The surgeon might tell the internist, for example, "Today I want this patient to have only parenteral glucose and saline." Then let the internist determine how much of each, when, and the dose of insulin to cover the glucose. The next day perhaps he will allow only surgical liquids by mouth and the day following nourishing liquids. The internist can make his calculations from these specifications. The surgeon will also know, far better than any internist, when he wishes his patient to have an enemia, if ever. It is conceivable that the medical service, unthinkingly, or rather, unsurgically thinking, might give an enemia too soon and too large for an intestinal anastamosis to stand the strain. Only when the patient has reached his normal, that is, recovered from his surgery, let the surgeon be dismissed and allow the patient to revert entirely to the medical man for his directions.

55 East Washington Street,
Chicago, Illinois.

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THE CAUSES AND TREATMENT OF SPONTANEOUS ABORTION

RALPH A. REIS, B.S., M.D., F.A.C.S.*
CHICAGO

The problem of spontaneous abortion is a most important one. This can be best understood when we realize that one out of every six or seven pregnancies terminates in spontaneous abortion. It has been estimated that there are some 700,000 abortions annually in the United States. At least 50% of these are spontaneous and the danger to life and health for the women of the United States can be well understood by these figures. It has been further estimated that at least 50% of all parous women past the age of thirty have had one or more spontaneous abortion.

The causes of spontaneous abortion fall into two large groups. The first of these is concerned with abnormalities of sperm, ovum, or defects in germ plasm.

Examination of the male semen shows a rather high frequency of pathology in the sperms. Such pathology varies from mild malformations of the sperm to complete sperm absence. Malformations of the sperm, lack of vitality and motility, marked failure in sperm production, both in size and number, are frequently found in association with inflammations of the male generative tract;

*Assistant Professor, Obstetrics and Gynecology, Northwestern University. Attending Gynecologist, Michael Reese Hospital.

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noteably, chronic prostatitis or seminal vesiculitis. These deficiencies can be readily determined by microscopic examination of the semen and examination of the male partner.

An equally frequent cause of abortion is found in improper development and maturation of the ovum. Lack of sufficient vitamins or calcium deprivation are the most common causes of defective ovum production. This is not, however, as easily demonstrable as are deficiencies of the sperm.

An apparently normal sperm may fertilize an apparently normal ovum and yet defective germ plasm may result. The percentage of congenital malformations and defects has been estimated as high as five percent. Careful examination of all embryos found in spontaneous abortion would show a much higher incidence of defective germ plasm. In fact, most fetuses with gross defects die early in utero and are cast off as spontaneous abortions.

The majority of spontaneous abortions will be found to be due to causes that are maternal in origin. In many women spontaneous abortion begins without any pain or uterine contractions. It begins with sudden, painless, causeless bleeding. In such women the site of implantation will frequently be found to be low in the uterine cavity; so low, in fact, that these might be termed miniature early types of placenta praevia.

The second large group of spontaneous abortions finds its origin in endocrine disturbances of the mother. Many of these will be found on careful study to be due to hypothyroidism. This is especially true in this part of the country where evidence of hypothyroidism can be found in well over one-third of all pregnant women who are carefully studied and whose basal metabolic rates are accurately determined. It is a well established fact that without normal thyroid function there cannot be normal estrin and progestin production.

Abortion is also rather common as a result of disturbed endocrine function of the ovaries themselves. This is particularly true with derangements of progestin production. Progestin which is the hormone of the corpus luteum of pregnancy is necessary in adequate amounts not only to prepare the endometrium for implantation but also to inhibit uterine contractions in order that the early pregnancy may remain attached to the decidua. In the early weeks of pregnancy these necessary amounts are produced by the corpus luteum of pregnancy. With the completion of placentation which is usually about the 12th week, the placenta takes over the function of the corpus luteum of pregnancy. In the event, then, that the corpus luteum of pregnancy stops producing progestin too soon, or the placenta begins its production of progestin too late, there results a period in which the patient does not have within her circulation sufficient progestin to keep the uterus quiescent. These are the patients who abort spontaneously with rather marked frequency and regularity toward the end of the third month of pregnancy. These fall into the group of "habitual abortion."

Infection also plays a role in the production of sponanteous miscarriages. Such infections may be local, involving the endometrium or the uterine wall itself. Focal infection may also be a causative factor and it is well known clinically that acute focal infections, especially those involving the urinary tract, the teeth, or the respiratory system, will lead to spontaneous abortion, the result of secondary deciduitis or placentitis. Generalized infections such as the acute contagious diseases, influenza, pneumonia, etc., always increase the incidence of abortion from the same causes. The story of every influenzal epidemic is one of marked increase in spontaneous abortions.

The last group of maternal causes of spontaneous abortion are those which include pelvic disease of the mother. Pelvic infection, as stated, frequently leads to abortion. In addition, pelvic tumors cause abortion. Such tumors may be submucous fibroids which cause abortion as the result of pathologic changes produced in the endometrium. Pedunculated ovarian cysts as well as pedunculated subserous fibroids will cause abortion only when such tumors undergo torsion or acute degeneration. Large pelvic tumors may cause abortion as the result of direct pressure on the growing uterus.

Retrodisplacement of the uterus was formerly held to be a frequent cause of spontaneous abortion. Retrodisplacement per se rarely causes abortion. When such retrodisplacement is found in association with underdevelopment or hypoplasia of the uterus, termination of the pregnancy will occur as the result of this failure of development of the uterus. Likewise uteri held in retrodisplacement as the result of inflamma-

tory or postoperative adhesions will result in abortions. The freely movable uterus lying in retrodisplacement will in the vast majority of instances rise spontaneously between the tenth and twelfth weeks of pregnancy. We no longer find it necessary to replace such a pregnant uterus nor to attempt to maintain replacement by the use of pessaries. It is the concensus of opinion today that such manipulation results in more trauma than if the uterus is allowed to remain in situ and subsequently to rise spontaneously. We have not found it necessary to replace such a retrodisplaced pregnant uterus for the last several years since we have adopted the conservative attitude.

It has been our clinical experience that all instances of spontaneous abortion will fall into one of four groups of approximately equal size. Roughly speaking, one quarter of such spontaneous abortions result from endocrine disturbances, a second quarter, from defective germ plasm, and a third quarter, from low implantation. The fourth quarter is made up of all the other above causes grouped together.

TREATMENT

The best results in the treatment of spontaneous abortion are obtained in the prophylaxis of this condition. Obviously nothing can be done when defective germ plasm or low implantation are the etiologic factors. The greatest amount of good can be done in the women in whom abortion results from endocrine disturbance. All women in whom hypothyroidism is suspected should have basal metabolic rate determination early in pregnancy and thyroid extract should be administered throughout the pregnancy in amounts sufficient to control any deficiency. We have found that the pregnant woman tolerates larger amounts of thyroid extract well. It is our belief that double the usual amount of thyroid should be given during the first three months of pregnancy. Our hypothyroid patients are therefore given two to four grains of thyroid extract daily until placentation has been completed. Following this, one-half to one grain per day will suffice.

The patient who has had previous spontaneous abortions or in whom uterine contractions, vaginal spotting or both appear during the second six weeks of pregnancy should be given progestin in amounts sufficient to keep the uterus quiescent and to aid in maintaining the normal progestin level until such a time as the placenta functions completely. For this purpose, it is well to give at least six units of progestin per week until well passed the thirteenth week. When threatened abortion occurs such patients must in addition, have absolute bed rest in order that the uterus may have further opportunity to remain quiescent. It is definitely inadvisable to give patients with threatened abortion morphine of any other opiates inasmuch as it has been definitely shown that morphine stimulates uterine contraction during the early months of pregnancy. It has become an accepted clinical fact that while morphine may stop the pain of uterine contractions it nevertheless increases both the frequency and intensity of such contractions.

When a threatened abortion becomes an inevitable abortion as evidenced by effacement and dilatation of the cervix, plus a continuation of uterine bleeding, it is our belief that such patients are best handled by prompt evacuation of the uterine contents. This brings to our attention the long continuing struggle between the so-called Radical and Conservative schools. Invasion of the uterine cavity is, in the majority of instances, a safe procedure. Repeated invasions on the other hand lead to a high incidence of infection and of sepsis. It therefore is inadvisable to invade and empty a uterus where there is even a suspicion of criminal abortion or of previous interference. For practical purposes, it is not difficult in private practice to distinguish between the group in whom pregnancy is undesirable and in whom there has been a criminal interference and the group which is desirous of offspring and which in addition has spent time and money toward the maintenance of the existing pregnancy. For the latter group, prompt emptying of the uterus is advisable when there is no evidence of infection present. Such patients will be saved many days of hospitalization and expense and absence from the family. It should be obvious that such an evacuation must be carried out carefully, gently, and with certain precautions. The cervix should be dilated slowly and gradually with graduated metal Hegar dilators until the canal is dilated to a degree sufficient to admit the examining finger. The products of conception should then be gently freed by the examining finger and removed thereafter by the ovum forcepts. The examining

finger shall then be used to determine the fact that the uterine cavity is empty. Following this, it is our custom to lightly curette over the site of implantation with a large, *dull* curette. At no time shall a sharp curette be used and at no time shall dilatation be rapid.

Patients treated in this way in the absence of demonstrable infection are usually home on the third to the fifth postoperative day. This procedure should never be carried out in the presence of demonstrable infection as evidenced by elevation in temperature, leucocytosis, or localized pain or tenderness. When infection is present or when there is reason to suspect previous invasion of the uterine cavity, the patient should be put to bed without local interference until either the uterus has emptied itself or all evidence of infection has been gone for at least 72 hours.

The only exception to this must be made in the presence of serious hemorrhage. Very occasionally, continuous bleeding of appreciable quantities or sudden large hemorrhage requires invasion of the uterus in spite of the existing infection. The risk involved is less than that resulting from continuous hemorrhage and the uterus must be invaded and emptied of the retained products of conception by gentle digital manipulation. Instrumentation and especially curettage are strictly contraindicated and dangerous.

By the adoption then of a course midway between the radical method on the one hand and the conservative method on the other hand, we will achieve our best results in the treatment of incomplete or inevitable abortion by careful individualization of our patients and particularly by careful evaluation of all the factors involved in a given instance of inevitable or incomplete abortion.

During the national emergency we will either make great gains or suffer great losses in our fight against tuberculosis. The gains will come from the chest X-ray examination that will be given the young men entering military service . . . the real losses will come if industry does not adopt the practice of X-raying employees. The massing of labor in concentrated areas creating crowded living conditions, increased mental, emotional and physical strain — inevitable by-products of industrial defense activities — are factors which increase and spread tuberculosis. Kendall Emerson, M. D.

NON-INDUSTRIAL EYE INJURIES

HIRAM J. SMITH, M.D.
AND
H. V. WADSWORTH, M.D.
CHICAGO

In discussing ocular injuries, it is natural to classify them according to type and as to etiology. Industrial surgeons have found that certain types of employment produce certain types of injury. We can apply preventive measures in accordance with causes most frequently encountered. In eye injuries this soon led to the adoption of safety goggles, and where this has been conscientiously carried out, the reduction in the number of major eye injuries has been very striking.

The general surgeon finds a characteristic type of fracture that has developed with the use of automobiles and they are commonly referred to as bumper fractures. In trying to apply this same principle to eye injuries, we meet with difficulty in forming a definite classification. When the cause of the injury does not fall under any definite type or category, it is difficult to formulate satisfactory preventive measures. Apparently, anything can happen and does happen, as I will show later in cases to be reported. One of the commonest causes of serious eye injuries is one that occurs in children and nearly as often in adults. It is characterized by punctured wound of the eyeball produced by cutting instruments or sharp tools where the movements employed are toward the face, rather than away from the body. This common practice, as in whittling a bit of wood with a pocket knife, or trying to untangle a knotted string with a kitchen fork, results in damaged vision. I am surprised to note the rarety of such injuries in manual training schools and believe the instructors have taken pains to educate their pupils in the correct use of tools.

It is true that a large number of persons wearing eye glasses would seem to afford an opportunity for the development of numerous injuries that would fit a similar classification, but when we review the eye injuries coming under our observation the past twenty years, we find numerous mention of minor injuries to the eyelid, brow, or upper cheek caused by breaking of eyeglasses. Surprisingly enough, I have a record

From the Medical Department, University of Illinois.
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of only three penetrating injuries of the eyeball from this source. One occurred as follows:

Two police officers were riding in a squad car and the one who was not driving had put on his glasses to write a report. The brakes on the squad car had been adjusted that day and the driver was unaware of the fact. When traffic was blocked, he put on the brakes and stopped the car so suddenly that his companion was thrown against the dash and a knob on the instrument board struck his right spectacle lense driving a fragment into the right eye in such manner that a complete aniridia and traumatic cataract occurred.

The second case was practicing golf strokes in a golf school. A driven ball struck an obstruction, rebounded, striking his spectacle lense, and produced an incised wound of the cornea from the pupillary area to the nasal border, no cataract resulting.

The third case, while watching a golf tournament and wearing glasses, was hit by a player who made an approach shot too soon. Again there was an incised wound of the cornea from nasal border to the pupillary area, but without lens injury and no cataract resulted.

In these two last mentioned cases, injury by fragment of spectacle lens driven into the eye by a golf ball, the scarring of the cornea was insignificant and useful vision has been retained in both cases. It is, of course, not unusual for corneal wounds, when clean cut, to heal with very slight scar formation in absence of infection. We have seen a case where a complete corneal incision bi-secting the pupil horizontally healed with a hair-like scar and retention of useful vision.

The three cases constitute a small percentage when you consider the large number of people who wear glasses. I see no practical method of preventing these eye glass injuries unless shatter proof lenses can be developed which would be more satisfactory for visual purposes than those we are now using. I have, however, prescribed this type of lens for individuals requiring correction for use in football and basket ball.

We will now describe four unusual penetrating injuries, non-industrial in character, which came to our attention in 1940.

R. F., a boy of 17, junior college student, on January 5, 1940, while running along the street at night, ran out along the tree bank under some shade trees in order to pass some people on the sidewalk. Unnoticed by him, there was a branch with a dead twig which struck him in the right eye penetrating the cornea at nasal border of the pupil and entering the crystalline lens and probably the vitreous, breaking off with a small splinter presenting at the inner aspect of the corneal wound. The patient was seen at the hospital within an hour and the foreign body was removed through wound of entry. X-ray the following day showed no foreign body. Complete cataract developed. Absorption of the lacerated lens occurred rapidly, and on April 22, 1940, discission of membraneous cataract was performed. On May 4 with correcting lense a vision of 1.2 was obtained. The uninjured left eye had vision of 1.2-2. By aid of a minimizing lens before the cataract eye, he achieved binocular vision.

On June 20, 1940, a young lady, D. C., aged 21, received a penetrating injury of the left eye. After opening a bottle of Coco-Cola, she placed the bottle on the drain board of sink while washing her hands. She dislodged bottle so it fell into the sink and broke, and fragment of glass struck left eye. We had thought that gas confined in the bottle might have been responsible for the injury, but the patient assured us that she had opened the bottle before she knocked it over. X-ray showed no foreign body. A spicule of glass penetrated the eye at corneo-scleral junction causing an incised wound 4 m.m. in length, vertically disposed and about evenly divided as to corneal and scleral extent. There was an incarceration of the iris tissue, but without prolapse, and no injury of lens could be made out. After a week's hospitalization she was allowed to go home, but was kept under observation. Her unaided vision in the right eye was 0.2 and with a plus 2.00 cylinder at axis 105, vision was 0.6 plus 3. On July 15, a cystic prolapse of iris through the wound was noted at the corneo-scleral junction. This was excised and a conjunctival flap drawn over the opening. The iris was allowed to remain adherent to the inner aspect of the wound. An iridectomy could have been done at the time of injury and thus the cystic prolapse would have been avoided. However, this would have resulted in a distorted pupil and the coloboma would not have been covered by the lower lid in reading, and glare would have resulted. Recovery uneventful and

on August 12 her unaided vision was 0.6 and with a —0.50 sphere, plus 2.00 cylinder, axis 90 equaled 1.0. Intraocular examination negative.

C. M., a boy, aged 14, was admitted to the hospital on November 3, 1940. He had been playing football on a vacant lot, and while running to catch a punt, ran into a thorn apple tree. A thorn penetrated the left eyeball in the ciliary region, upper nasal quadrant. The thorn was evidently green as it did not break. X-ray showed no foreign body. There was considerable hemorrhage in the anterior vitreous in the vicinity of the wound. The eye was kept under atropine and patient kept in bed for five days when anterior vitreous was found to be clear and the tension of eye had returned to normal. On November 20, 1940, right vision was 1.0 plus, and left, 1.0-2, and on November 27, right vision was 1.0 plus, and left, 1.2. Refractive error was very slight and no glasses prescribed.

A. H. the fourth patient, aged 33, came to the hospital on January 1, 1941. On New Year's Eve, she had gone to a restaurant with her husband to celebrate advent of the New Year. Over the heads of the diners were suspended toy balloons, which were inflated to about 10 inches in diameter. The patrons were making merry with these balloons by batting them back and forth and this patient reached up to grasp one of the balloons in both hands and the balloon burst and something immediately struck right eye. Examination showed a complete laceration of the right cornea extending from the lower portion of the pupil toward the corneo-scleral margin near six o'clock. There was also a laceration of the anterior capsule of the lens, which was opaque and lens material protruded in a cauliflower mass to the posterior surface of the cornea.

How are you going to explain a perforated injury of the eyeball caused by a toy balloon? We would not believe it, but there it was. We believe that the cord by which the balloon was suspended had broken when the balloon burst and the contraction of the rubber whipped the string attached into her eye with sufficient force to cause the wound described. We considered also the possibility that a piece of wire, or small nail, or tack might have been attached to the cord. Again X-ray showed no foreign body. It is, of course, possible that a foreign body may have penetrated the cornea and not remained in the eye. The medical-legal aspect of this latter case prevents our obtaining further information as to what might have caused this accident. Naturally, the owner of the restaurant does not want to give any information that might be used against him in court.

A few remarks about the general handling of penetrating injuries of the eye may be in order.

(1) *History*: A careful analysis of the circumstances that led to the eye injury should always be made and preferably at the first visit of the patient. In cases that have a medical-legal significance, many facts will be admitted at the first visit that may be suppressed or colored after the injured person has had time to reflect or consult an attorney.

(2) *X-ray*: We have a standing order that all penetrating injuries of the eye must be x-rayed as soon as possible, even when there is no history of hammering or the use of metal-cutting tools.

We recall a history of a colored railroad employe where the importance of both procedures is obvious. The employe stated that at the time the accident occurred, he was inside a box car with the door closed, inspecting the interior with artificial light. As he was looking toward the ceiling of the car, he claims to have felt an injury to one of his eyes. No workmen were in the car at the time. The injured employe insisted that he was not doing anything except looking toward the ceiling with the light. X-ray showed a metallic foreign body inside the eyeball. This was removed and careful examination by experts did not identify the metal with any tools used in the car repair department.

It is our belief that this employe was injured off duty, that is, he may have been doing some mechanical work on his own premises or elsewhere, but preferred to make the claim that his injury occurred while doing work for the railroad. His powers of invention were, of course, very limited and it is quite obvious that the injury could not have occurred in the manner described by the employe.

(3) *Local Treatment*: No irrigation should be used where penetrating injury of the eye is suspected. The prognosis of these injuries depends largely upon the presence or absence of infection. We must be careful to do nothing that might introduce infection from without. We cannot avoid the occasional occurrence of blood-

born infection from some other part of the body. The use of an antiseptic ointment and sterile dressing and bandage are considered the best procedure. Rest in bed should be insisted upon, especially in those cases where the intraocular tension is reduced to prevent retinal detachment. Tetanus antitoxin had best be given in all penetrating injuries. In ninety-nine cases it is unnecessary, but there is always the one case that may have been infected with this serious disease.

(4) *Trauma to the Lens*: This complication must be dealt with according to the symptoms which may develop as the result of the injury. The liberation of lens protein in the eye sometimes gives a serious response in the way of inflammation, and foreign protein injections are very helpful in controlling this reaction. The lens substance free in the anterior chamber may obstruct the chamber angle and give rise to increased intraocular tension. Swelling of the lens from the absorption of aqueous may be a factor in producing this symptom. Whether or not the lens should be removed will depend upon the conditions present and no hard and fast rule can be established.

(5) *Enucleation*: The question as to when the eye should be removed is sometimes difficult to answer. There may be a reasonable difference of opinion on this point, even when all would agree that the eye should be removed ultimately. When the eye has been obviously destroyed we know that enucleation must be performed sooner or later. It is sometimes possible to get permission to remove the eye immediately after the accident, but again we find that many patients do not want to consider an important step like this right after the serious injury. It has been our policy to allow the eyeball to repair itself when this is possible, as operation is much easier and results more satisfactory when done in this way.

It is difficult to enucleate a collapsed eyeball and sometimes the implantation of an artificial sphere is not easily performed under these conditions. Also you do not know whether infection is present or not. On the other hand, we have just finished with a case where we believe that an immediate enucleation would have been preferable. The usefulness of the eyeball had been destroyed by a penetrating injury. The patient's general condition was not satisfactory for operation. Infection occurred later and orbital cellulitis resulted. The subsequent removal of the eye after the inflammation had subsided was not at all easy, though the results appear satisfactory. Many operators complain to us of difficulty in obtaining retention of the artificial sphere. The reason for the failure to retain an artificial eyeball usually depends upon two conditions. If infection has occurred, the tissues of the orbit are friable and we are very doubtful that any artificial eyeball can be retained. In that case, we would recommend removal of the damaged globe as soon as feasible and not implanting an artificial eyeball until all inflammation or infection is believed to be absent.

The second factor that leads to the failure of retention is the lack of drainage. By closing Tenon's capsule and the conjunctiva over the artificial sphere, an impervious diaphragm is formed across the anterior orbit, and it is the pressure of fluid behind this diaphragm that causes the extrusion of the artificial eyeball. Drainage is imperative. If a small incision is made at the external canthus through the conjunctiva and into the muscle cone, and the sterile gauze wick is introduced, no difficulty will be encountered in retaining the artificial sphere, for the reason that hemorrhage or exudate is allowed to escape. We gradually withdraw the wick of gauze, taking out the last of it about the fifth day. In support of this technique, we may say that we have had only one artificial eyeball extruded in the last ten years, and that occurred because of the friability of the tissues following an orbital cellulitis accompanying the injury.

We cannot close the discussion of this subject reasonably without mentioning sympathetic ophthalmia, which occurs in a small percentage of penetrating injuries. We have been fortunate in this respect. The only case coming under our observation was not the result of an accident, but followed carefully planned cataract extraction. It has been our policy to remove all irritable or painful eyes where useful vision has been lost. As a further safeguard we advise removal of all eyes where the eyeball is disfigured as the result of the injury, for cosmetic reasons. The fact that our industrial patients are under supervision by a medical department may account for the low incidence of sympathetic inflammation.

It is true that the literature shows authentic cases of sympathetic inflammation occurring a few weeks after the initial injury. Most of our

penetrating wounds have been observed for a period of two to six or eight weeks before enucleation was carried out, and our experience so far has not indicated that we have been taking undue risk. It is not always possible to say immediately after an injury whether the prospect of vision is entirely gone and the cosmetic result also may be in doubt until longer period of observation has elapsed.

In the medical treatment of iridocyclitis following trauma, we have come to rely upon sodium salicylates more than any other drug except atropine. We would like to repeat the advice of the late Harold Gifford, who suggests the use of sodium salicylates in doses of one grain per pound of body weight in twenty-four hours. We would add to this the intravenous use of the same drug in 15 to 30 grains dosage, especially where it is not well tolerated per oram. This is even helpful in the lens reaction referred to above as an adjunct to foreign protein therapy. Sulphanilamide, or its less toxic derivatives, should give promise in ocular infection as stated by Dr. H. W. Woodruff in a recent communication.

DISCUSSION

Dr. Herman R. Davidson, Chicago: Doctors Smith and Wadsworth are to be congratulated on bringing these unusual eye injuries to our attention. There is a suggestion that injuries to adults and children by sharp tools could be avoided by proper education in handling such tools, especially in the home. Their three cases of injury by the penetration of spectacle lenses would call for universal use of hardened lenses or some other lighter plastic material that does not shatter.

The four unusual cases almost defy any known safety measure of prevention. Surely one cannot prevent a boy from running along the street at night; nor prevent a young lady from drinking coco-cola; nor prevent a boy from running after a football; nor expect a lady to desist from breaking balloons that float by her table on New Year's Eve.

Their points on the handling of injuries are excellent and I am sure we can all profit by their advice. I want to emphasize one of their suggestions, namely, to make a small incision at the external canthus through the conjunctiva into the muscle cone and introduce a gauze wick to prevent loss of the artificial implant.

Everyone who has practiced long enough sees the unusual sooner or later. A high myope wearing his glasses getting out of his bath, slipped, broke the lens, and made a perfect cataract incision above with slight prolapse of the iris, and this healed up as well as if he had been operated on aseptically. Another case was the penetration of the globe by an icicle which broke off from the roof. Still another unusual one was penetration of a globe by a "bobbie pin" while the patient was asleep in bed with his lids closed. In all of these unusual accidents there is no known way of prevention.

There is another type of post-Christmas accident that is preventable. The sale of a metal compound with molds to make toy soldiers should be prohibited. On heating this metal sometimes a "wet spot" gets under the metal and explodes, with resultant face and eye burns.

A careful record of all non-industrial accidents and the manner of their occurrence should be kept. Nowadays the insurance companies have reached down to the individual with resultant legal aspects.

Dr. Hiram J. Smith, Chicago: I have a few pictures to show, some of which are of patients described in the paper. I would like to see pictures taken of injured eyes in all cases, and I am going to have them from now on. I cannot think of any better record than an actual photograph of the eye.

The slides which I shall show now give the results obtained in three penetrating injuries of the cornea of unusual origin; also one secondary glaucoma with complete iridoplegia following cerebral concussion, and a case of subconjunctival hemorrhage, idiopathic type, in a young patient.

PREPARATIONS FOR A GAS ATTACK

It is known that the Germans have large quantities of poison gas available and therefore a gas attack on this country on a large scale is regarded as a definite possibility. As part of air raid precautions, anti-gas measures are receiving attention. It is recognized that the first experience of gas might cause alarm. It has been said that a people who can stand the terrors of aerial warfare as at present known to them will not be broken by gas as long as they are prepared. Surprise would be its chief advantage. A new gas is of course not impossible, but experts believe that any development in gas technic is more likely to be in new methods of releasing the poison. The official advice is to be suspicious of any unaccountable smell or effect on the eyes, nose or lungs and to put on the respirator immediately. Any attempt by civilians to distinguish the particular gas is discouraged as likely to involve unnecesarry exposure.

At the air raid precautions school there are almost unlimited opportunities to demonstrate the effect of chemical warfare. Dissemination of gases is studied at close quarters, and methods of detection are demonstrated. The decontamination service comprises squads of five men . . . [censored]. Reserves must be available. Local authorities are arranging for the interchange of first aid and gas decontamination services. These authorities have prepared as far as possible for the rapid recovery of all public services after a gas attack. But individuals must look after their own safety as they have been instructed in anti-gas measures by government leaflets.—J. A. M. A., May 24, 1941, *London Letter.*

MALARIA TREATMENT OF NEUROSYPHILLIS AND MALARIA AMONG DRUG ADDICTS AS PUBLIC HEALTH PROBLEMS

G. Howard Gowen M.D., F.A.P.H.A.*

Since the discovery of the cause of malaria by Laveran in 1880, the subsequent proof in 1897 by Ross and in 1898 by Grassi and his associates that anopheline mosquitoes are responsible for dissemination of the infective agent, there have been two interesting developments that have opened new channels for the spread of this disease: (1) the introduction of artificially induced malaria fever as a means of treating neurosyphilis by Wagner-Jauregg in 1918; (2) the emergence from Egypt in 1929 of the vogue of common use of the hypodermic syringe by drug addicts for the intravenous administration of heroin.

While it is true that malaria is still spread principally by certain species of anopheline mosquitoes from cases and carriers of the plasmodia, we now have two new artificially created reservoirs. In artifically induced malaria therapy the mosquito would still be the vector for naturally occurring secondary cases, but in drug addiction we have a different agent of transmission, the hypodermic needle. In both instances certain interesting potentialities present themselves.

In artificially induced malaria therapy the benign tertian strain is generally used. The strain employed has presumably lost its ability to form gametocytes and so should not be able to be transmitted by anopheline mosquitoes. This was the original contention of Wagner-Jauregg[1] who stated gametocyte formation is inhibited by continuous human passage. On the other hand Plehn,[2] Mari,[3] Bravetta,[4] and Muhlens and Kirschbaum[5] reported finding gametocytes after as many as forty human passages. They used both the tertian and quartan plasmodium. Fischer[6] and Yorke and Wright[7] using a tertian strain passed through 53 individuals artificially, reported the successful transmission of malaria from patients to healthy persons by anopheline mosquitoes.

Evidence would point therefore to the fact that benign tertian malaria may not permanently remain in its asexual form, and patients so inoculated may infect mosquitoes and lead to secondary cases. This is suggested by three reports. Kling[8] in 1926 reported two cases in Sweden in patients located 100 meters from the ward in which patients inoculated with malaria resided. A report in Lancet[9] of July, 1934 mentions a case in a laborer working near an asylum in Paris where malaria therapy of paretics was employed. Shaughnessy[10] in 1936 reported 15 cases of malaria related to an institution in southern Illinois where malaria therapy was employed. Seven were uninoculated inmates who had been in residence for some time, six were employees, and one was a bedridden child living three blocks from the institution. It was found that anopheles punctipennis and anopheles quadrimaculatus were breeding freely in an ornamental pool within 150 feet of the malaria therapy ward and in other spots on the grounds. The patients were kept in unscreened quarters. Smears from the blood of patients receiving malarial therapy showed gametocytes capable of infecting mosquitoes. While no dogmatic statements were made in conclusion, there was evidence to suggest that the outbreak could have been secondary to cases receiving malarial therapy.

Soon after introduction of artificially induced malaria treatment of neurosyphilis, the United States Public Health Service circularized the mental hospitals in regard to the employment of measures that would prevent the unnecessary spread of the disease. If patients receiving this type of therapy are isolated in properly screened quarters during the mosquito season, and if after completion of the treatment they receive a standard course of antimalaria therapy and are not released until blood smears show the absence of malarial parasites, any resultant hazard would be remote.

On the basis of a questionnaire sent to fourteen mental hospitals in various parts of the United States it was found that there was considerable inconsistency in regard to isolation of the patient, screening of quarters, terminal therapy and final release as being free from malaria. All of the hospitals reported that no secondary

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*Professorial Lecturer in Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Michigan; formerly Chief Medical Officer, Chicago Health Department, and Assistant Professor of Bacteriology and Public Health, University of Illinois, College of Medicine.

cases had occurred traceable to inoculated paretics. On the basis of the small number of cases of malaria suspected as being secondary to artificially inoculated patients, the hazard would seem to be more apparent than real. Possibly more thorough epidemiology might alter the picture somewhat. Regardless, however, the situation still warrants the consistent employment of accepted preventive measures.

In Illinois the State Department of Public Health requires that institutions employing malaria therapy follow accepted procedures in the isolation of patients during treatment and subsequent release of patients after completion of treatment. In order to follow more closely the final disposition of such cases, the following special form was introduced for the reporting of artificially induced malaria:

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
Division of Communicable Diseases
Form For Reporting Artificially
Induced Malaria

Date .....

Name .....
Age ..... Sex ..... Color .....
Date of admission to institution .....
Diagnosis .....
Approximate date of primary lesion .....
Date and duration of antiluetic treatment if any* .....
.....
.....
Date malarial treatment instituted .....
Type of malarial parasite employed .....
Method of inoculation of patient .....
Approximate number of rigors that occurred .....
Date antimalarial treatment instituted .....
Name of drug employed in antimalarial treatment .....
Dosage and duration of antimalarial treatment .....
Date of release as free from malarial parasite .....
Release of patient based on how many negative blood smears .....
Dates of blood smears .....
..... M. D.
Managing Officer

*Include here information, if available, concerning type of antiluetic drug employed, number of injections, etc.

During 1938 and 1939 there were 24 and 37 cases respectively of artificially induced malaria reported to the Illinois Department of Public Health.

The first epidemic of malaria among drug addicts due to common use of the hypodermic syringe was described by Biggam[11] in 1929. In 1932 Geiger[12] reported five cases in morphine addicts. Four were of the benign tertian type and gave a history suggesting common use of a hypodermic syringe. In 1934 Helpern[13] described 49 cases occurring in New York City. In 1940 Most[14] gave an extensive report on malaria found in drug addicts in New York City from 1933 to 1938 inclusive. He found the malignant tertian (P. Falciparum) to be the common type, and the user of heroin by the intravenous route to be the person usually involved.

In Chicago we have been aware of the transmission of malaria in drug addicts by common use of the hypodermic syringe for some time. Table 1 shows the incidence of this disease in drug addicts from 1933 to 1939 inclusive.

TABLE 1

Year	Type of Drug Addiction	Cases in Drug Addicts	Total Cases Reported	Per Cent. In Addicts
1933	Morphine 5			
	Non-specified 3	8	47	17
1934	Heroin 1			
	Morphine 1			
	Non-specified 1	3	25	12
1935	Heroin 8			
	Morphine 2			
	Non-specified 7	21	83	25
1936	Heroin 16			
	Morhpine 2			
	Non-specified 15	33	75	44
1937	Heroin 12			
	Morphine 3			
	Non-specified 13	28	68	41
1938	Heroin 18			
	Morphine 6			
	Non-specified 17	41	89	46
1939	Heroin 16			
	Morphine 3			
	Non-specified 16	35	91	35
Total 1933 to 1939		169	478	35

Table 2 shows the total deaths from malaria during 1938 and 1939 and the per cent. of total deaths occurring in drug addicts.

TABLE 2

Year	Deaths from Malaria in Drug Addicts	Total Deaths from Malaria	Per Cent. of Deaths in Drug Addicts
1938	10	12	83
1939	17	21	81
Total 1938-'39	27	33	81.8

In order to determine the experience in other parts of the United States, a questionnaire was sent to the other fourteen largest cities in 1939. The health departments of ten of these cities had no information on this subject because malaria was not tabulated according to whether the patient was a drug addict or not. From Detroit, although no statistics were available, it was reported that on the basis of observation in the phsychopathic ward of the Receiving Hospital, probably the majority of cases of malaria treated in the institution were in drug addicts. It was learned from Minneapolis that the three cases reported in 1937 were drug addicts and that the infection had been transmitted from one of them to the other two by common use of a hypodermic syringe. Philadelphia reported that of the 44 known cases of malaria from 1936 to December

18, 1939, five were drug addicts. The City of New York Health Department reported that from 1937 to and including the first eleven months of 1939 there were 253 cases of malaria reported of which 117 or 46 per cent. were in drug addicts. Morbidity statistics were not available prior to 1937 on the incidence of malaria in drug addicts. From 1933 to and including the first eleven months of 1939 there were 131 deaths from malaria of which 110 or 83 per cent. were in drug addicts. It is interesting at this point to note the similarity of the Chicago and New York figures in regard to per cent. of total cases and deaths from malaria that occurred in drug addicts which were 41 and 46 per cent. of the cases respectively, and 82 and 83 per cent. of the deaths respectively.

From 1937 to 1939 there were six deaths from malaria in drug addicts at the Cook County Hospital that came to autopsy. These cases exhibited findings similar to those in the cases studied by Most at the Bellevue Hospital, New York City. The patients were either in coma or markedly toxic and expired a few hours after admission. From the histories of the cases the common symptoms were chills, fever, headache, stiff neck, vomiting, diarrhea and pain in the abdomen. The malignant tertian parasite was found in four of the cases, and in the other two the type of parasite was not identified. In a series of blood smears from known drug addicts submitted to the laboratory of the Illinois Department of Health during 1938 and 1939 for diagnostic purposes, the parasite found was of the benign tertian type.

In Chicago the drug commonly used by addicts is heroin. The type of heroin obtainable is so adulterated that it contains about two per cent. of anhydrous heroin. The addict shoots himself with an average of 50 to 100 grains of this product per day in order to actually get one to two grains of pure heroin. In spite of the numerous hypodermic injections seldom is complete satisfaction obtained. The administration of the drug is attempted primarily by the intravenous route. Most of the addicts place a hypodermic needle over the end of a medicine dropper and use this in place of a syringe with little if any attention to asepsis. The transmission of malaria, of course, results from common use of the hypodermic needle. The fact that each addict has to resort to so many injections per day in order to satisfy his craving should also favor the spread of the disease. The addict does not commonly carry his hypodermic outfit with him due to fear of being picked up by the police with it in his possession. When in need of the drug he will visit one of his addict friends and while there, will use the other individual's hypodermic outfit.

Malaria in drug addicts would be difficult to control. If strict asepsis were adhered to in the administration of the drug, the artificially transmitted disease should disappear from this group. Whether such education could be accomplished remains to be proven. While it is true that a reservoir of malaria is maintained in drug addicts, it is questionable whether in Chicago this would ever prove to be a hazard to the general population. It has been suggested that drug addicts should be searched for latent cases and carriers, and such cases and carriers should be treated so as to render them gametocyte free. Such a program would be expensive, extremely difficult to carry out, and would probably not produce much tangible result. In Chicago at the present time the mosquito population capable of transmitting malaria is so small that the possibility of the transfer of malaria from a drug addict having the disease to the general population by such mosquitoes would be remote. According to the report of the Desplaines Mosquito Abatement District, about two-tenths to one per cent. of the mosquitoes caught each year in the Chicago area have proven to be anopheles quadrimaculatus, and one to two per cent. anopheles punctipennis. The former is a good carrier of malaria, but the latter is a very poor carrier of the disease. In cities such as New York and Chicago the drug addict will definitely influence the annual statistical picture of malaria both in regard to morbidity and mortality. Other than that, in Chicago, the problem in drug addicts would seem to be one peculiar to that group, and not of general public health importance.

SUMMARY

1. Since the introduction of artificially induced malaria fever as a means of treating neurosyphilis by Wagner-Jauregg in 1918, three outbreaks totalling 18 cases have been reported in which there was evidence pointing to the fact that these cases could have been secondary to

patients artificially inoculated with the plasmodium of malaria. It is suggested that accepted procedures in malaria control be employed in and around institutions using this type of therapy.

2. Evidence has been presented to the effect that the spread of malaria among drug addicts by use in common of hypodermic syringes has occurred and is occurring in various parts of the United States. The greatest concentration of such cases appears to be in New York City and Chicago. But this would be better clarified if other large cities would tabulate reported cases of malaria according to occurrence in drug addicts and naturally occurring cases. Both the benign tertian and malignant tertian strains of plasmodia may be spread among drug addicts. In fatal cases the plasmodium falciparum seems to be most common. Whether a preventive program should be attempted among drug addicts is open to question, but in any event such a program would be extremely difficult to carry out.

5052 Marine Drive

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A college president who would never tolerate a contaminated water supply on his campus must learn not to permit an open, broadcasting case of tuberculosis loose among his young people. Sneaking tuberculosis must be painted as the crippler and killer it is, more to be feared than the sporadic, dramatic visits to the campus of such well publicized maladies as influenza, measles or mumps. Mild illness in the mass fills the headlines, while deadly tuberculosis, working twenty-four hours a day in its own quiet fashion, goes on filling sanatorium beds and cemetery plots. Charles E. Lyght, M.D.

OBSERVATIONS ON PNEUMONIA OF INFANTS AT COOK COUNTY HOSPITAL, SEASON OF 1941

JOSEPH GREENGARD, M. D.
WILLIAM B. RAYCRAFT, M.D.
AND
LOUIS S. FRANK, M.D.
CHICAGO

In the infant ward at Cook County Hospital careful observations have been made in the cases of primary pneumonia under one year of age for the past several years. Since March 1939 these babies have been treated with sulfonamide compounds with a material reduction in the mortality and hospital stay. The cases seen in 1939 and 1940 were treated with sulfapyridine, and this group has been previously reported. Since it is true that epidemics of pneumonia vary from season to season in both their specific etiology and in their behavior as far as clinical manifestations as well as mortality are concerned, it is worth while comparing the findings of various years so that the value of a particular type of therapy may be gauged. In January and February of this year it was noted that the acute respiratory tract infections in these babies were different in certain respects, from those observed in 1939 and 1940. The infants were entering the ward in large numbers and seemed desperately ill. The degree of toxemia was great, the temperature only moderately elevated, and respiratory embarassment was a prominent symptom. The infants were blue, very dyspneic, often revealed a considerable degree of paralytic-ileus with abdominal distention and in many cases appeared to be in extremis at frequent intervals during the first few days of their hospital stay, requiring almost constant and heroic symptomatic therapy to combat their extreme respiratory embarrassment. On physical examination the outstanding feature of the pulmonary findings was the presence of a diffuse asthmatic type of bronchitis with generalized dry rales and prolonged expiration noted over the chest, associated with scattered subcrepitant rales and in some cases evidences of atalectasis in various areas. Furthermore the early cases did not seem to show the dramatic response to sulfapyridine that we had become accustomed to see in the majority of the pneumonias observed

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in previous years. We, therefore, decided to use sulfathiazol in the therapy of all cases during this period since we suspected that the specific etiology might differ from that seen in preceding years. It is this group of 200 infants seen during 1941 and treated with sulfathiazol which is the subject of this report.

Table 1. Comparative Study of Pneumonia Statistics.

Age of Patient	Birth to 3 Months	3 Months to 6 Months	6 Months to 9 Months	9 Months to 12 Months	Totals
1 No. of Cases	52	53	42	37	184
9 Recovered	29	39	30	27	125
3 Died	23	14	12	10	59
7 Mortality	44.23%	26.41%	28.59%	27%	32.06%
1 No. of Cases	47	85	83	74	289
9 Recovered	25	51	60	61	197
3 Died	22	34	23	13	92
8 Mortality	46.8%	40%	27.71%	17.56%	31.83%
1 No. of Cases	41	66	52	41	200
9 Recovered	36	58	48	38	180
4 Died	5	8	4	3	20
0 Mortality	12%	16%	7%	7%	10%
1 No. of Cases	57	58	52	33	200
9 Recovered	55	57	51	33	196
4 Died	2	1	1	0	4
1 Mortality	3.5%	1.7%	1.9%	0	2%

Table 1 shows the age distribution and mortality in the 1941 series compared with those treated at County Hospital in previous years. It will be noted that in 1937 and 1938, before any specific chemotherapy was used, the average mortality in these cases of pneumonia was 32% and 31% respectively. In 1940 when all cases were treated with sulfapyridine, the mortality dropped to 10% and in 1941, the series which is the subject of this report and was treated with sulfathiazol, the mortality for the entire group was but 2%. When the cases are divided according to age groups, we find as expected, that the youngest infants reveal the highest mortality. But here again in our present sulfathiazol treated series the death rate has dropped to 3.5% in the 57 infants under 3 months of age. In the 1940 sulfapyridine treated series of 41 infants in the same age group 5 or 12% died, while in the 1937 and 1938 series which received no chemotherapy the mortality was 44% and 46% respectively. In the group from 3-6 months of age the mortality was 1.7% in the sulfathiazol series, 16% in the sulfapyridine treated series, and 26% and 40% respectively in the 1937 and 1938 infants. In the babies over six months of age there is further reduction in the mortality, only 1 baby in this group died in the sulfathiazol series, 7% in the sulfapyridine series and around 27% in the 1937 and 1938 series. These figures are striking and require little comment. All of these infants were treated by essentially the same personnel and by similar methods with the exception of the use of sulfonamide drugs. While it is true as pointed out previously that the character of the disease is different in succeeding seasons, the drop in mortality is so definite that it must be a valid reduction. We may, therefore, say that though the infants observed this year were much sicker than in the previous years, caused much more anxiety and much greater physical effort in their management than in the preceding groups, the mortality was surprisingly low. It is our feeling that this fact is due only in part to specific drug therapy. It is also of interest that in the 1941 series the younger babies were the ones most frequently involved; 57 of this series of 200 were under 3 months of age, while in 1937 there were 52 of 184 cases, in 1938, 47 of 289 cases, and in 1940, 41 of 200 cases in this age group. Similarly in the oldest infants those between 9 months and 1 year of age there were 33 in the sulfathiazol series, 41 in the sulfapyridine series, 37 in the 1937 series and 74 in the 1938 series.

Bacteriology. From a practical standpoint a great deal is gained if the specific etiologic factor is isolated in the pnemonia of infancy. Though it is neither necessary nor desirable to wait for the results of cultures before the infant is placed on drug therapy one should not overlook the importance of obtaining material for culture as soon as possible and before the blood stream has accumulated an appreciable quantity of the drug. Sputum should be obtained in all cases and if possible blood cultures should also be taken routinely. In small infants obtaining sputum constitutes a major problem but with care an organism will be obtained in most cases. The various methods used have been previously described. In this series of infants we found pneumococci in the sputum much less frequently than we had in either the 1939 or 1940 series. In the 1941 group no organism could be obtained in 59 or 29.5% of the cases. In 10 cases no typing was done and in the remainder an organism was isolated, usually a pneumococcus. In the 1939 series only 2 sputa were negative and

in 1940, 9 specimens failed to yield organisms. Where pneumococci were obtained the distribution according to type was similar to that noted in previous years, though 5 cases fell in Type III, a rather large proportion of the group where typing could be obtained. As in previous years Types XIX and XIV were the commonest with 11 and 8 cases respectively. Type XXIII also showed 8 cases, types VI and XI, 7 cases each and Type XXXIII, 6 cases. Of the four fatalities in this series only 1 yielded a pneumococcus in the sputum, which was Type XIX. Thus another different feature of this series from the 1939 and 1940 group lay in the rather large proportion of cases in which no pneumococcus could be isolated. This again led us to postulate some other etiology, and suspicion naturally was directed to a virus as a possible cause. Attempts were therefore made to isolate a virus from nasopharyngeal washings, sputum, and in some cases from other body fluids, all of which were unsuccessful. As in previous years the bacteriology in these infants was carried out by the Chicago Branch Laboratory of the Illinois State Department of health under the direction of Dr. H. J. Shaughnessy. The virus studies were carried out by Dr. Zitches of this laboratory. (Table 2)

TABLE 2. BACTERIOLOGY

Type	Recovered			Died		
	1939	1940	1941	1939	1940	1941
I	2	1	2			
II	1		1			
III	1	4	5			
IV	1	4	3			
V	1		2			
VI	8	14(12(2))	7	3		
VII	3	9	4	1	5	
VIII		1	3			
IX		1	2		1	
X		2	X A 1			
XI	1	6	11			
XII	(1)		3			
XIII		2(1(1))	1			
XIV	15(14(1))		8			
XV	6(5(1))		4			
XVI	2(1(1))		3			
XVII	(1)		5			
Not Obtained	4	9	6		11	3
Neg. Sputum	2	9	57			
Staph					1	
Hemolytic Staph	8	70	3			
Totals	52	98	131	4	18	3
XVIII	3	4	3	(1)		
XIX	9(6(3))	21(16(5))	10	1		1
XX	1	8	5	1	(3)	
XXI	2	4	2			
XXII		4	4			
XXIII	2	10(4(6))	7			
XXIV		3(2(1))			(3)	
XXV						
XXVI						
XXVII						
XXVIII	3(2(1))	3	2			
XXIX		5			2(1(1))	
XXX						
XXXI		2(1(1))	1			
XXXII	1					
XXXIII		1	6			
Reilly			2			
Hemolytic Strep.	5	6	8	1		
Strep. Viridens	8(5(3))	12	5	1		
Indiff. Strep.		7	9			
Unclass. Pneumo.	2	5	1		1	
Totals	29	82	65	4	2	1

Therapy — On admission these infants were immediately placed on sulfathiazol in much the same manner as in the sulfapyridine treated series. In those infants who were vomiting, were badly distended and required continuous gastric aspiration, or were in collapse the drug was initiated as the sodium salt intravenously. The others received sulfathiazol in powdered form in dosages approximately 1½ grains per pound of body weight per day divided into six equal amounts administered at four hour intervals. As a rule an initial dose of one half the total 24 hour dose was given. Table 3 shows a resume of our observations on this therapy in comparison with similar findings in the 1940 series of 200 cases which received sulfapyridine.

TABLE 3. RESUME OF PNEUMONIA
Jan.-Feb. 1941

Average Age of Entire Group (200 Cases) — 5 Months		
Average Stay in Hospital — 10.8 Days		
Complications — Total Number	—	69
Sup. Otitis Media.	—48.	
Diarrhea.	—8.	
Empyema.	—2.	
Pneumococcic Meningitis	—1.	
Circulatory Collapse and Abdominal Distention	—7.	
Tracheo-Bronchitis	—3.	
Therapy Other than Specific		
Oxygen		
Blood Transfusions	—103	
Continuous Gastric Aspiration.		

It will be noted that the average total dose of sulfathiazol was 95 grains while that of sulfapyridine was 75.04 grains. Similarly the average number of days on specific therapy was greater in the 1941 series, being 6.9 days in comparison with 4.12 days in the 1940 series. This confirms the statement made previously that the drug seemed definitely less effective than in the 1940 cases in most of which a pneumococcus was isolated since more of the drug and a longer period of therapy were required. This fact should not be interpreted as indicating

less effectiveness in the case of sulfathiazol but rather a difference in the character of the pneumonia dealt with in the 1941 series. Toxic effects were also seen much more often this year, vomiting being observed 31 times. It may still be said, however, that this very young age group tolerates the drug very well, comparatively much better than older children or adults. In spite of the evidence of less effectiveness of the chemotherapy the mortality was but 2% in the sulfathiazol treated cases and 10% in the sulfapyridine treated series. This we feel again should not lead to the conclusion that the cures were effected by the therapy but more probably indicate a benign type of pneumonia. As in the 1940 series specific serum therapy was used in combination with the drug in those cases which yielded a pneumococcus and were desperately ill, usually with excellent effect.

Symptomatic therapy played an extremely important role in this 1941 group, in fact many of these infants were undoubtedly saved by the persistent and untiring efforts directed to combat cyanosis and abdominal distention. The measures employed and their indications were as follows:

Parenteral Fluid — Fluids in the form of 2.5 to 5% Dextrose in normal saline or Dextrose — Hartmans solution — were administered by the subcutaneous and intravenous route when oral administration was not feasible. Hypertonic fluids as 10 or 20% Dextrose were used in some instances to combat cerebral oedema.

Whole Blood — Critically ill patients were given blood transfusions. Intramuscular blood was given to all infants on admission as a routine measure. 75-100 cc. of whole preserved blood was administered by slow intravenous drip and repeated as frequently as indicated by the condition of the infant. The external jugular and scalp veins or more commonly, the superficial veins of the extremities with cut down technic were used. The frequent and free use of blood seemed to be a most effective aid.

Oxygen — Oxygen was administered to all infants who were dyspneic and cyanotic. The oxygen tent was an effective and important means of relieving such symptoms and their accompanying restlessness. Further, the cooling effect of the tent was utilized to combat the hyper pyrexia that occurred in these cases. When tents were not available oxygen by nasal catheter was used.

Abdominal Distention — This complication, occurring frequently and seriously impairing the respirations of the infant, required prompt relief. A routine consisting of pitressin (½-1 ampoule) or prostigmine (½-1cc 1:4000 solution) hypodermically, soap-suds enemas, heat to the abdomen and an indwelling rectal tube, was employed as the most effective means of relief.

Shock — was a frequent complication and required emergency therapy. Caffeine and adrenalin either singly or in combination, were used by hypodermic or intravenous routes. Intracardiac adrenalin was used when heart tones were not audible and other means had failed. In four instances the heart tones reappeared and the patients ultimately recovered. Artificial respiration, external heat, and reverse Fowler's position were used in addition to the drugs.

Convulsions — When convulsions occurred, they were controlled by sedation and spinal puncture. Seconal was employed rectally in dosages of 1/10 grain per pound either in the form of a punctured capsule or in solution as a retention enema. When this failed, intravenous sodium amytal was effective. Spinal punctures were done for diagnostic purposes as well as to relieve increased intracranial pressure. Intravenous hypertonic glucose was employed with the spinal puncture.

Wheezing — was treated with adrenalin hypodermically, ephedrine and phenobarbital by mouth, and steam inhalation. These measures were usually effective but not uniformly so.

Atelectasis — when suspected by physical examination or Xray, was treated effectively with frequent co_2 inhalations and changes in position of the infant.

Diarrhea was a fairly common problem but responded to the usual simple method of treatment.

Complications — A list of the complications seen in this series is given in Table 4. Suppurative otitis media was the most common complication and occurred in 48 or 24% of these cases. Diarrhoea was noted 8 times and circulatory collapse with abdominal distention occurred in seven infants. Empyema was found in two of these infants. This complication has become definitely less common since specific drug therapy has been employed. In the 1939 and 1940 series no single case of empyema was found in

TABLE 4. — RESUME OF SPECIFIC THERAPY.

1941	200 Cases	1940	200 Cases
Average Total Dosage of Sulfathiazole	—95 gr.	Average Total Dosage of Sulfapyridine	—75.04 gr.
Average Number of Days on Therapy	—6.9 Days	Average Number of Days on Therapy	—4.12 Days
Toxic Effects		Toxic Effects	
Edema	—1	Toxic Eruption	—1
Vomiting	—31		
Mortality	2%	Mortality	10%

these infants. Thus but 2 instances have been observed in 489 cases of primary pneumonia under one year of age. One of these was a 6 month old white infant who entered the hospital January 24, 1941 on the 8th day of her illness. She had had fever, cough and repeated vomiting during this period and on admission was dyspneic, cyanotic and toxic. Physical and Xray findings indicated an effusion in the right chest which on tapping yielded a thin brownish pus. The sputum revealed a Pneumococcus Type XXII, though this organism could not be obtained from the pleural exudate. She received 190 grains of Sulfathiazol over a period of 12 days and 130 grains of sulfapyridine over a period of 7 days. 100,000 units of type XXII antipneumococcus serum was given intravenously on January 25 when the organism was reported in the sputum. Her condition was grave, she had marked respiratory embarrassment and cyanosis and was kept in an oxygen tent continuously. A bilateral suppurative otitis media developed and required myringotomy. Active measures to combat abdominal distention were necessary, and intravenous fluids and whole blood were repeatedly administered. Her empyema was treated by a closed method of drainage. She made a complete recovery and was discharged in excellent condition after 34 days in the hospital. The second case of empyema entered the hospital January 13, 1941 on the sixth day of his illness and expired 43 hours after admission. He was desperately ill in coma and on physical examination revealed evidences of fluid in the left chest. This was aspirated and yielded a staphylococcus on culture. The sputum failed to reveal an organism. He received 37 grains of sulfathiazol during his hospital stay, intravenous fluids and whole blood were administered, a bilateral myringotomy was done, adrenalin and caffeine were required for circulatory collapse. No autopsy could be obtained.

This series also included one case of pneumococcus meningitis which recovered. In the 1940 series there were two cases of pneumococcus meningitis, one a type VII and one a type XVIII both of which died. Thus in these 489 cases of pneumonia in infants there were 3 specific menigitides with 1 recovery and 2 deaths. The 1941 case was a 6 month old colored infant who was admitted February 16, 1941 on the fifth day of her illness. She had had a running nose, cough, and fever prior to admission at which time she was dyspneic and toxic and showed Xray evidence of a diffuse bronchopneumonia. A pneumococcus type XXIII was isolated from the sputum and she received Type XXIII serum and 176.25 grains of sulfathiazol over a period of 8 days. She remained desperately ill during this period requiring continuous oxygen, intravenous fluids and blood and on the 9th day it was noted that the fontanelle was bulging. A spinal puncture was done yielding a purulent fluid which on culture revealed a pneumococcus type XXIII. Therapy was then changed to sulfapyridine and the infant received 551.25 grains in the succeeding 20 days. She made a complete recovery and left the hospital in good condition, April 16, two months after admission.

Fatalities — Table 5 shows the details of the four fatal cases. In two of these an autopsy was performed and revealed a focal and confluent bronchopneumonia. One of the others was the fatal case of empyema above described. The fourth case was a 7½ month old infant who entered the hospital in convulsions on the 6th day of her illness and died 9 hours later. She showed physical findings of a diffuse bronchopneumonia and a type XIX pneumococcus was isolated from the sputum. She received 11¼ grains sulfapyridine, a bilateral myringotomy was done, and intravenous whole blood was given. Spinal puncture yielded a normal fluid. The total dosage of sulfathiazol in the other three fatal cases was 31 grains, 50 grains, and 50 grains respectively. In none of these three could an organism be isolated from the sputum.

SUMMARY AND CONCLUSION

A series of 200 infants under one year of age with primary pneumonia was observed during January and February of 1941. These infants were treated with sulfathiazol in dosages of 1.5

grains per pound of body weight per day. It was noted that though the mortality was very low, only 2%, the response to the drug seemed less favorable than that noted in previous years, a larger amount of chemical and a longer period of treatment were required. This less favorable response was probably due to the fact that the cases observed included a large number of pneumonias which differed in their behavior from those of previous years and may have been due to an organism less susceptible to chemotherapy. In support of this theory is the comparatively poor success in isolating specific pneumococci from the sputum in this group as compared to the excellent record in 1939, and 1940. Also the clinical symptomatology with severe respiratory embarrassment and physical findings of a diffuse pneumonia with much wheezing was very different from the clinical picture of pneumococcus pneumonia we are accustomed to see. Though this evidence made us suspect a virus etiology we were unsuccessful in our efforts to isolate such an organism. Among the complications seen in this series was a Type XXIII pneumococcus meningitis which was treated first with specific serum and sulfathiazol on the 8th day of which therapy the meningitis was recognized, and then with sulfapyridine with recovery. Two cases of empyema were also seen, one of which recovered and one of which died. The lessened frequency of empyema since chemotherapy is noted. A resume of the four fatalities is included.

4753 Broadway, Chicago.

1011 Lake St., Oak Park.

DISCUSSION

Dr. G. L. Kaufman, Chicago: I feel that it is a privilege and an honor to be asked to discuss this paper. I think Dr. Greengard and his workers ought to be congratulated on the tremendous amount of work they have done. Our experience does not compare nor does our work compare with his.

In looking over our pneumonia cases for 1940 under one year of age, we find 67 cases. Of these 67, we had 26 deaths. Analyzing those deaths we find six were in the hospital less than 24 hours and twenty of them were in longer than one day. Seventeen of those 20 either came in with complications or congenital defects, such as glaucoma, congenital absence of the gallbladder, fibrocystic disease of the pancreas, etc., leaving us about three cases without complication or defect. We do not do routine typing of pneumonia. Occasionally we will type, but we have found that we have not been successful.

Of our cases we had 46 on sulfapyridine, 8 on sulfathiazole and 3 on sulfanilamide. We find that with sulfapyridine the temperature comes down much faster than with sulfathiazol. I think Dr. Greengard noted that in his cases too. Our average for getting the temperature down with sulfapyridine was two days, while with sulfathiazol it was four days. We gave large doses as soon as the patient came in. Previously we gave too small doses, and we had recurrences or the patients came back with temperature or chemically fast organism, so we have given rather large doses. We give 2 grains per pound of body weight over two or three days and of all our cases we had only one who showed any drug reaction, with a rapid decline in the hemoglobin, but as soon as we stopped the drug and gave a transfusion the youngster immediately rallied and came back to normal.

We have seen many cases of patchy atelectsis and we feel this is a definite entity. We also feel that the drug has not had the same desirous effect on these cases as it has on the bronchopneumonia or lobar pneumonia.

All our cases are either put in the oxygen tent or given other sustaining remedy. We feel sure that with the chemotherapy plus oxygen the mortality among children has certainly declined.

Dr. Maurice L. Blatt, Chicago: I want to take this opportunity to congratulate ourselves, your Chairman and your Committee on Program for having selected Dr. Greengard to present this paper and Dr. Kaufman to discuss it. The paper is superior and deserving of more discussion than our limited time allows.

Dr. Greengard's favorable report shows what may be accomplished by teamwork. His associates, Dr. Raycraft and Dr. Frank, almost lived in the wards. Dr. Frank worked with little sleep, often without meals, and collapsed two weeks after he left the service; as the result of an infection of the lung picked up from these children, and he has not worked since. It is through such self-sacrifice, through fine nursing care, and by the use of serum and chemicals that these results were obtained.

You have had two series of cases from two different institutions in Chicago, with very different mortality rates. There is some difference in the type of patient, but the more active treatment in Dr. Greengard's cases must be considered the essential factor in his low mortality. The treatment at the Cook County Hospital is shock treatment. Every case under one year of age entering the hospital is given shock care until it is out of that shock. We know our cases have been neglected and are bad to begin with, so we are prepared to give them immediate and active treatment.

The cost of the treatment has been greater this last year than before. I was called to the Administrative Office recently to explain why the cost of dry ice

had risen from $4 per month in the past to $247 per month recently.

I have seen little toxicity from sulfathiazole. We have noticed that you cannot discontinue the use of sulfathiazole as early in the disease as you could sulfapyridine. The 24 per cent of otitis media which Dr. Greengard mentions is quite in keeping with the high incidence of otitis media seen throughout Chicago during this period. It has been more frequent this year and there have been more mastoid complications in the past year than in the one preceding.

The fact that Dr. Greengard was unable, with the assistance of the same laboratories and the same technicians, to obtain pneumococci from as many of these patients as in previous years would seem to indicate that the disease was not identical with the disease we have had in the previous year, but the results of treatment with sulfathiazole were probably as good or better than they would have been with sulfapyridine.

I again want to compliment the essayist on his work and the able manner in which it was presented.

Dr. Joseph Greengard, Chicago (in closing): We felt rather badly that we were unable to prove our point of a possible virus etiology. To us this seemed definitely a unique epidemic. These children began coming in about Christmas and then stopped abruptly around the first of March, and we felt we were dealing with some specific epidemic since the patients acted very sick but the condition actually seemed to be benign so far as the death rate was concerned. Isolation of a virus is a laborious process and I suppose we should not be too disappointed because it takes a well equipped and rich institution to do very much in the way of a virus study.

SEVERE SKIN REACTIONS RESULTING FROM THE ADMINISTRATION OF SULFAPYRIDINE

Sulfapyridine may cause severe toxic skin reactions, especially when administration of the drug is continuous or prolonged. Three young negroes, under treatment for gonorrheal urethritis, developed such lesions after receiving 34, 63 and 71 Gm., respectively, of sulfapyridine. In each case the eruption was generalized and varied in form from maculopapular to vesicular, pustular and bullous. Severe itching and desquamation occurred in each case. Associated, generalized discrete enlargement of the lymphnodes, likewise, was a finding common to each case. Evidence of renal damage was not observed. Leukocyte counts were elevated in 2 cases, but no appreciable elevation of the count observed in the third case. Erythrocyte counts and hemoglobin levels remained within normal levels. None of the patients showed any appreciable evidence, previous to the severe toxic skin reaction, of sensitivity to the drug.—*LeRoy W. La Towsky, M.D., Charles A. W. Uhle, M.D., and Frank Knight, M.D., Medical Times, March, 69: 120-124, 1941.*

ACUTE SUPPURATIVE EPIDIDYMITIS CAUSED BY PNEUMOCOCCUS

NORRIS J. HECKEL, M.D.

AND

FRED. W. PRESTON, M.D.

CHICAGO

It is extremely rare for the pneumococcus to be the infecting organism in epididymitis. For this reason and because we were interested in the pathogenesis of pneumococcal epididymitis, the following case is reported.

CASE REPORT: *History* — Mr. J. B., a sixty-six year-old white male was admitted to the service of Dr. N. J. Heckel at the Presbyterian Hospital, May 17, 1940. His only complaint was swelling of the scrotum to such size that it interfered with his walking.

At the age of 21 he had an acute gonorrheal urethritis, following which he developed a stricture of the membranous urethra. At about the age of 46, a spontaneous swelling of the scrotum had taken place, and from that time until shortly before the time of hospital admission his scrotum had been as large as a medium size apple, but had produced no symptoms. The patient had neglected treatment for this condition until 9 days previous to admission to the hospital at which time a No. 18 F. sound was passed by another physician, and the following day the right side of the scrotum again began to swell. Four days later when the mass had attained the size of a grape fruit, the patient sought medical attention for the relief of the mechanical inconvenience which it caused him.

The remaining past history and family history have no bearing on his present condition.

Physical Examination revealed a 66 year-old emaciated white male. The temperature was 100° F., the pulse rate, 90, the blood pressure 160 systolic and 60 diastolic. The head was negative except for the presence of many carious teeth. The chest examination was negative. The heart borders were within normal limits; however, there were frequent extrasystoles, and a systolic murmur at the apex transmitted to the anterior axillary line. Examination of the abdomen and extremities was negative. The scrotum was swollen to 17 cms. in length and 11 cms. in transverse diameter. The overlying skin was violaceous and edematous, and the underlying structures hard and irregular in consistency and outline. The mass was not tender, did not transilluminate, and no fluctuation was present. An enlarged, soft, symmetrical prostate with no accompanying tenderness or fixation was palpated rectally.

Laboratory Studies. Several catherized specimens of urine showed an average of 180 white blood cells per c.mm. of uncentrifuged urine. The white blood count was 23,000. A blood wassermann was negative.

Course and Operation: Elevation of the scrotum and the application of hot packs gave no relief during

From Presbyterian Hospital, and Rush Medical College of the University of Chicago.

the three days after admission to the hospital. On May 20, under general anesthesia a 9 cm. long incision was made in the right side of the scrotum. The spermatic cord was ligated at the external inguinal ring and a large tense tumor mass was shelled out and removed in one piece. The scrotum was then closed and a small penrose drain left in place. An incision into the tumor showed that it consisted of many cavities containing greenish, purulent material. The testis, epididymis, tunica vaginalis and vas were involved, and only with difficulty could they be identified. Smears and cultures were made from the pus and gram positive diplococci identified as pneumococci type 10 were found to be present in abundance. No other organism was present.

Subsequent course. The drain was removed on the third postoperative day and the patient had an uneventful, afebrile, postoperative course. He was discharged from the hospital on the ninth post-operative day.

Pathology: The gross specimen resected at operation weighed 208 grams and measured 15 cm. in length and 9.5 cms. in transverse diameter. Section through the tumor (Fig. 1.) showed the greater part of it to be made up of separate multilocular encapsulated cystic masses containing purulent material. The lower pole of the tumor contained the testis which had a somewhat

Figure 1: Cut section of a tumor removed from the scrotum. At the right side of the mass are the testis and body of the epididymis. The remainder of the mass consists of multilocular cavities containing pus.

softened cut surface but otherwise no abnormality. The tail of the epididymis contained necrotic material and pus similar to that in the cystic masses. The tunica vaginalis was somewhat thickened, but its visceral surface appeared normal, and it contained no hydrocele fluid or exudate.

Microscopic Section through the epididymis showed desquamation of the cylindrical epithelium of the tubules and collections of cellular debris within their lumina. The interstitial tissues were intensely infiltrated with polymorphonuclear and lymphyocytes, and minute focal abcesses were present. In some areas these had become confluent and had ruptured into the lumina of the tubules. Involvement of the tail of the epididymis was more advanced than that of the head. Section through the wall of a typical large cystic cavity showed it to be composed of scar tissue and circular masses of hyalinized fibrous tissue. A few giant cells were present.

COMMENT

In a review of the literature we were able to find seven cases of epididymitis or epididymo-orchitis in which the pneumoccoccus was identified as the only infecting organism.* Among 3606 patients with epididymitis treated at Bellevue Hospital, New York, Campbell encountered one case which occurred following pneumonia presumably by blood borne infection, but no mention is made of the identification of the pneumococcus. Two cases in which the pneumococcus was obtained in pure culture are reported by Landivar; one was a twenty month-old infant who had pneumonia eight days previous to the onset of the swelling and pain in the right testicle; the second patient a 28 year-old male, developed an epidymo-orchitis following drainage of a subscapular abscess. Jasonna had a three year-old patient in whom epididymitis occurred following a broncho-pneumonia complicated by empyema. In Landor and Sreenivasan's patient bilateral epididymo-orchitis developed after a pneumonia had subsided, and in Henrickson's patient a bilateral epididymitis followed a bronchitis. In these cases, epididymitis occurred as a secondary infection to a primary focus in the respiratory tract; or, as in one instance, secondary to a subscapular abscess. It is probable that the organism reached the epididymis as a metastatic infection carried by the blood stream.

In our patient, an acute inflammatory process was superimposed on a chronic process of about twenty years' duration. We found no evidence of primary infection in the lungs or respiratory tract and the patient could not recall any such infection in the twenty-five years previous. The fact that the acute swelling immediately followed the passage of a sound suggests the possibility

*Table 1.

TABLE 1
SUMMARY OF CASES OF EPIDIDYMITS AND EPIDIDYMO-ORCHITIS CAUSED BY THE PNEUMOCOCCUS

Author	Primary condition	Complications	Treatment of complication	Result
Landor & Sreenivasan	Bilateral lower lobar pneumonia 19 days previous	Bilateral epididymo-orchitis	Bilateral incision & drainage	Recovery
Landivar	Pneumonia 8 days previous	Right epididymitis	Aspiration followed by incision & drainage	Recovery
Landivar	Abscess below right scapula 30 days previous	Left epididymo-orchitis	Incision & drainage	Recovery
Jasonna	Broncho-pneumonia empyema, 3 weeks previous	Left epididymitis	Aspiration followed by incision & drainage	Recovery
Henricksen	Bronchitis 3 or 4 days previous	Bilateral epididymitis	Incision & drainage	Pyemia and death
Huard and Boutareau	Acute g.c. urethritis 4 years previous; trauma to testicle immediately preceding; left hydrocele 2 years' duration	Right epididymo-orchitis	Epididymotomy & orchidectomy	Recovery
Valerio	Acute gonorrheal urethritis, 14 years previous	Right epididymitis	Conservative management followed by incision & drainage	Recovery

that the organism was introduced into the urinary tract by way of the urethra, or else the trauma of this instrumentation had relighted an old infection. A similar case is reported by Huard and Boutereau. Their patient had a hydrocele of two years' duration, following trauma, incurred while horse-back riding. An epididymo-orchitis which contained a pure culture of pneumococcus developed. Valerio's patient had a negative past history, except for an acute anterior urethritis 14 years before developing an epididymitis. This patient similarly had no primary infection in the respiratory tract.

Treatment — Apparently from the knowledge gained from reports in the literature concerning patients with pneumococcal epididymitis and the experience with our own patient, the treatment of this condition, in contrast to the treatment of cases due to non-specific organism or the gonococcus, is incision and drainage. This method was used in six of the seven cases collected from the literature. In our own case, because of an extensive lesion containing many abscesses, complete removal of the inflammatory mass, which contained the testicle, was the only procedure possible. Although pneumococcal epididymitis is extremely rare, one must consider the possibility of this condition when a patient does not respond to conservative treatment within a reasonable time, especially if there is a history of antecedent infection in the respiratory tract.

SUMMARY

1. A case of epididymitis caused by pneumococcus type 10 is reported.

2. It is likely that the infection ascended from the urethra since there is a definite history of instrumentation and no antecedent respiratory or pulmonary infection.

3. Seven cases of epididymitis or epididymo-orchitis caused by the pneumococcus are collected from the literature. In five of these there was an antecedent pneumonia or other acute primary infection outside the urinary tract.

4. The treatment of pneumococcal epididymitis or epididymo-orchitis in most cases is incision and drainage.

122 S. Michigan Blvd.
1753 W. Congress St.

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THE DIAGNOSIS OF PULMONARY HEART DISEASE (COR PULMONALE)

WALTER R. TOBIN, M.D.
CHICAGO

Although pulmonary disease has been known to produce heart disease for over four centuries, this relationship has never been given the attention it rightly deserves in medical literature and practice. It is true that this type of heart disease is among the varieties whose comparative incidence is low, yet it is none the less important and deserves emphasis. Ample historic evidence to support this relationship is not lacking. It is a proven clinical entity, yet in contrast to the other types of heart disease, this diagnosis is seldom made.

The most widely accepted explanation for the pathogenesis of this form of heart disease is, that extensive, long standing disease of the lung parenchyma, pulmonary vessels, or gross deformities of the thoracic cage may cause obstruction to the flow of blood through the pulmonary vessels, and as a result, a compensatory hypertension in the lesser circulation is set up. This pulmonary hypertension places a strain on the right ventricle, which, if long continued, leads to hypertrophy, dilitation and eventual failure of this chamber, by the process of fatigue rather than degenerative changes. This hypertension in the lesser circulation and its effect on the right ventricle is considered by some, comparable to hypertension in the systemic circulation, with its corresponding effect on the left ventricle. It should be remembered in this connection, that the texture of the right ventricle is more delicate than that of the left. The ratio of the thickness of the walls of the left and right ventricles is normally about 3:1.

From the Department of Medicine, Northwestern University Medical School.

Presented before the Section on Medicine, 101st Annual Meeting, Illinois State Medical Society, Chicago, May 22, 1941. Illustrated with lantern slides and Case Histories.

The etiology of the underlying pulmonary disease may be widely varied, and is in no way specific. It must, however, be extensive enough to interfere with the free flow of blood through the pulmonary vascular bed, and be existant over a long period of time. Among the more common varieties are:

Pneumoconiosis (fibrosis due to the inhalation of dust) found principally associated with dusty occupations, examples of which are: Silicon dust, in granite, quartz, sand or asbestos workers; iron and steel dust, in polishers and grinders; stone dust, in cement and quarry workers; and to a lesser degree workers in dust originating from vegetable origin such as flour mills, cotton and woolen mills, tobacco factories, and so forth.

Pulmonary fibrosis due to any chronic inflammatory process in the lungs such as chronic bronchitis, bronchiectasis, fibroid tuberculosis.

Asthma and resulting emphysema (may also be associated with chronic bronchitis).

Pulmonary collapse, from any cause if extensive and long standing.

Gross deformities of the thoracic cage, sufficient to diminish the oxygenating capacity of the lungs (marked scoliosis or kyphosis).

Ayerza's disease (syphilitic pulmonary endarteritis).

Pick's disease, with extensive adhesions involving the mediastinum.

Emphysema from any cause either singly or in combination with other factors mentioned.

The symptoms are variable and depend somewhat on the nature of the underlying pulmonary disease, and the length of time it has been present. Dyspnoea, cough, cyanosis and weakness may have been present for long periods of time as the result of the pulmonary disease, and, as these same symptoms may represent early cardiac failure, it is frequently difficult to determine where the former leaves off and the latter begins. This difficulty is enhanced, because of the long chronic course of the pulmonary disease, and the usually slow insidious onset of the cardiac weakness and failure. It is this combination that frequently causes the transition period to be overlooked by patient and physician alike. As the case progresses, the above symptoms be-

come increasingly severe and disproportionate, to what would be expected from the pulmonary aspect alone. Later, with the onset of frank right heart failure, symptoms resulting from enlargement of the liver, and edema of the lower extremities, become apparent.

The physical findings, too, may be confused with those originating from the pulmonary background. Cyanosis, moisture, rales in the lungs, and tachycardia, may have been present for some time previous to the onset of the heart involvement, but with the advent of cardiac failure, these findings become more marked. Clubbing of the fingers and toes are added features frequently seen. The heart may show enlargement to some degree, but as often as not, this is not discerned until relatively late. A pulmonary systolic murmur has been described as an inconstant finding. The signs referable to the heart when advanced failure occurs are, engorgement of the great veins of the neck, enlargement of the liver, edema of the lower extremities, and orthopnea. Elevation of the red blood count and hemoglobin, to levels far above normal, are common findings.

The electrocardiogram may show right axis deviation. Enlargement of the right ventricle may be difficult to show with the X-Ray, as this chamber lies anterior, in relationship to the other chambers, and any increase in its size extends downward, instead of to the right as might be expected, presenting the pattern of the so-called "drop heart." Bulging of the right border of the heart, in the P.-A. view may be seen, if the process has advanced to the stage where the right auricle is involved. Enlargement of the pulmonary artery can be discerned, by the finding of a prominent pulmonary conus on the left cardiac border. In the later stages the heart usually shows some enlargement over all, but not infrequently the enlargement is not characteristic of any particular pattern. These findings are best demonstrated with the fluoroscope by one thoroughly familiar with this procedure.

The course of this type of heart disease is variable, but in general follows the course of the underlying pathology. As the latter progresses, which it usually does, more and more strain is thrown on the lesser circulation and right heart, until failure finally occurs. During the course of the disease, the reserve of the right heart is diminished, and, as would be expected, becomes less able to withstand any added burden that might be imposed upon it. A common example of this, is acute respiratory infections, that are prone to occur in these patients, especially during the winter months. It is common for them to experience cardiac decompensation during the course of these respiratory infections and again regain compensation as soon as the infection subsides. Pneumonias, however, impose a real hardship on these already damaged hearts, which but few are able to withstand. The mortality rate of pneumonia patients with Cor Pulmonale is exceedingly high.

The requisites for the diagnosis of Cor Pulmonale, as laid down in the "Criteria for the Diagnosis of Heart Disease," sponsored by the American Heart Association, are as follows:

(1) The presence of specified pulmonary disease.

(2) Evidence of cardiac insufficiency with marked cyanosis.

(3) Evidence of enlargement of the right ventricle.

Although these criteria are well defined, difficulties in diagnosis may arise, especially in cases where the signs and symptoms are difficult to distinguish, from those originating from the pulmonary disease. In this connection, White, in his text, makes the following statement: "The right ventricle may be slightly hypertrophied in the milder cases, adding little to the heart weight, escaping observation, and passing notice, sometimes even at postmortem examination." This is especially true in the early stages, the so-called transition period, where many of the identifying characteristics are lacking. In order to make a diagnosis that is timely, one should consider all patients in this pulmonary category, as potential candidates for this type of heart disease, if they live long enough. The onset of disproportionate cyanosis, dyspnoea, tachycardia and weakness should arouse suspicion that the heart is probably responsible for these additional findings. If now, or when later, additional clinical or laboratory evidence appears, such as, right axis deviation in the electrocardiogram, elevation of the red blood count and hemaglobin to levels above normal, clubbing of the fingers or toes, and evidence in the X-Ray

of right heart enlargement, the diagnosic problem becomes increasingly less difficult. Occasionally one is confronted with frank cardiac failure in these patients, before the usual typical findings make their appearance. This may happen if the cardiac reserve is sufficiently lowered, and an added burden, such as acute respiratory infection is contracted. In this case, in the absence of other etiological factors, the diagnosis is practically assured. Other types of heart disease which produce a clinical picture similar in some respects to, but not classified as Cor Pulmonale, include certain types of congenital heart disease, pulmonary stenosis, and mitral stenosis. In Cor Pulmonale, as in all other types of heart disease, failure and decompensation is the usual last chapter.

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Indiana, Kentucky, New Jersey, Oregon and Washington are on the roll of states which have laws calling for a specific examination of all school personnel in contact with children. Other states vary widely in their programs but in most states there are some communities offering voluntary tuberculin tests or local board rulings requiring specific examinations for tuberculosis of applicants for teaching positions. Report of Nat'l. Tuber. Assn., Sept. 1941.

THE DIAGNOSIS AND TREATMENT OF DIAPHRAGMATIC HERNIA IN CHILDREN

JOHN M. DORSEY, M.D.
CHICAGO

Diaphragmatic hernia in children has been recognized clinically with increasing frequency in recent years. Infants at birth or shortly thereafter who vomit, become dyspneic or cyanotic, especially at the time of feeding, should be suspected of having a congenital type of diaphragmatic defect. If symptoms do not manifest themselves until the age of one year or older, they are more likely to be those of bowel obstruction, intermittent perhaps, with associated pain and vomiting. It is not the purpose of this paper to enter into a differential diagnosis of these symptoms, but instead to emphasize the importance of associating them with diaphragmatic hernia.

Why there should be the difference in time in the onset of symptoms is readily understood when the physiology of the thoraco-abdominal relationship is recalled. Those infants having symptoms from birth have their hernias developed to the point of producing disturbances in the cardiorespiratory mechanism at once. Those in which there is a delayed onset may have just the same type of hernia once it is discovered, but it must be assumed that in the beginning there was only an embryological defect in the diaphragm. Just as in inguinal hernia, a defect may be congenital but the factors which in life increase intra-abdominal pressure, such as crying, coughing, straining, etc., are necessary to the actual production of hernia. The thorax exercises an even more powerful force and that is the negative pressure which it develops when respirations are begun in the new-born. It is constantly present, temporarily increased with each inspiration, and in the presence of a diaphragmatic defect it is very potent in its influence on hernia formation.

Congenital diaphragmatic hernia constitutes a serious menace to the life of the new-born. Death may be due to mechanical disturbance of the cardiorespiratory mechanism, to aspiration of stomach contents into the tracheobronchial tree with subsequent development of an

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aspiration type of pneumonitis, or to bowel obstruction. Whereas there are no large series of necropsies available to indicate the incidence of diaphragmatic hernia as a cause of death, it is interesting to note that Lissowetzky,[1] in the course of 220 routine autopsies on infants, found three congenital diaphragmatic hernias, or an incidence of 1.8 per cent. The hernia was the cause of death in each instance.

Harrington,[2] from his exhaustive study of the condition, has classified diaphragmatic hernia into two groups: "The nontraumatic variety may be congenital or acquired. If congenital, the hernia is attributable to embryologic deficiency, and does not have a hernial sac. The most common sites of a congenital hernia, in the probable order of frequency of occurrence are: (1) Through the hiatus pleuroperitonealis (foramen of Bochdalek); (2) through the esophageal hiatus; (3) through an anterior substernal opening (foramen of Morgagni) (space of Larrey), and (4) through the gap left by partial absence of the diaphragm, a gap which is usually situated in the posterior portion of the muscle.

"If the hernia is acquired after birth, the sites of occurrence are (1) through the esophageal hiatus, a type which has a hernial sac, (2) through the region of fusion of the anlage of the diaphragm, and (3) at sites named under the congenital type in the foregoing paragraph.

"Traumatic diaphragmatic hernia may be caused by direct or indirect injury, or by inflammatory necrosis of the diaphragm as may occur in subphrenic abscess. In cases of indirect injury of the diaphragm, the hernia may occur at any point, including those of embryonic fusion, but the most common sites are the dome and posterior half of the left diaphragm."

The diagnosis of diaphragmatic hernia is based on the recognition of the previously described symptomatology as being associated with defects in the diaphragm, and once such a situation has been suspected, proof of its existence should be sought for by means of roentgenologic study. Under the fluoroscope it is possible to recognize in most instances whether or not there is present an eventration of the diaphragm. This is a non-surgical condition and is characterized by a marked elevation and thinning of the diaphragm on the affected side, usually the left, due to insufficiency of the muscle from previous disease or to injury of the phrenic nerve. The thin leaf of diaphragm forms a sac-like concavity into which stomach or colon may be displaced so as to resemble intrathoracic herniation. Eventration may produce dyspnea but is a nonfatal condition.

With the aid of a barium enema and barium by mouth, it is possible to determine the type of herniation present and the viscera involved. Harrington states that on this basis (the viscera involved) it is possible to divide hernias clinically into two main classes. In the first the stomach is the only abdominal viscus incorporated in the hernia; the hernia usually occurs through the esophageal hiatus. In the second class, the intestines with or without the stomach and other abdominal viscera are included in the hernia. Such a hernia is usually of traumatic origin and is caused by laceration of the normal diaphragm. It also may be of congenital origin and may result from structural deficiency of the diaphragm. It is not possible always to be sure of the size of the defect in the diaphragm, however, except at operation.

There are in addition certain other physical signs which may be associated with the presence of diaphragmatic hernia. There may be unusual tympany, as well as peristaltic tinkling heard rather high in the thorax. The heart sounds may be audible more clearly in the opposite chest and the apex beat may also be displaced. These in a child whose abdomen is more than normally flat strongly suggest the evisceration of abdominal contents into the thorax.

The treatment of diaphragmatic hernia begins with the acute awareness of the symptomatology which leads to early diagnosis. Since diaphragmatic hernia is primarily a mechanical derangement, surgical correction and repair of the abnormal aperture in the diaphragm is the only treatment which offers permanent cure with alleviation of symptoms.

The principles governing the treatment of diaphragmatic hernia in children are somewhat different from those which pertain to adults. Congenital hernia in the new-born, I believe, comes within the realm of surgical emergencies, with certain reservations. Those infants who have a hernia in which primarily the stomach is

the viscus which has been displaced through an abnormal esophageal hiatus may be treated medically until they are several months to a year old, provided they are being sufficiently nourished. However, if, due to vomiting, these infants are not being sufficiently nourished and show no gain in weight, surgical repair of the hernia should be done. It is recognized that many of these hernias are small enough so as to produce no symptoms, remaining only as enlarged esophageal hiatal openings in many instances, until some increase in intra-abdominal pressure either enlarges an originally small lesion or produces for the first time actual hernia. This usually occurs in later life.

As Hartzell has shown[3] in his analysis of 68 operated diaphragmatic hernias in children ten years of age and under, the mortality from the operative procedure is highest in the first year of life. Because of this, there is a tendency to postpone operation, but this is justifiable in the newborn only under the above described conditions. The majority of hernias in the new-born are of the type in which the intestines are the primary constituents of displaced viscera. These in my opinion are surgical emergencies and should be operated upon by a surgeon familiar with such disorders and as soon as sufficient fluids have been given and operative facilities arranged for.

The following case history illustrates what may happen when surgery is postponed. Infant T. J. was admitted to the Presbyterian Hospital on November 1, 1938, fourteen days after normal delivery. The birth weight was 7 pounds 8½ ounces, and on admission to the hospital the weight was 7 pounds 2 ounces. On the fourth day after birth the child was noticed to have labored respirations before the 2 A.M. feeding. During the next two days it was noticed that if the infant were placed or held with his right side dependent, feeding and respiration were quite normal. Roentgenologic studies demonstrated a defect in the right diaphragm with herniation of loops of small bowel into the thorax. The heart and mediastinum were displaced to the left. The stomach was below the diaphragm. Surgical repair was postponed, with the idea of improving nutrition. The infant gained about an ounce per day for ten days, ceased to gain steadily thereafter, and died thirty-eight days after birth from aspiration pneumonia. At necropsy there was found a slit-like defect in the right posterior lateral diaphragm 32 mm. long and from 4 mm. to 20 mm. wide. There was no sac. The lesson was obvious: that this hernia could have been simply reduced and repaired, and in all probability the infant's life saved.

The traumatic hernias in children should be treated in principle like those in adults. Operation should be postponed until the dangerous effects of the trauma have been cared for. The hernia may be treated as an elective procedure but not delayed too long. Adhesions which may form must not be allowed to become firm. Obstructive symptoms, even perforation of a viscus due to "traumatic erosion" (Harrington) might supervene, so making delay dangerous. A further important reason is that in infants and children during development, if the abdominal viscera for the most part occupy one or the other pleural spaces or the mediastinum, the size of the abdominal cavity remains so diminished that it will accommodate the replaced viscera with considerable difficulty after the repair is made.

It is important that the principles involved in the surgery of diaphragmatic hernia children be emphasized: First, with certain exceptions hernias should be operated upon as soon as possible after diagnosis; second, the so-called true hernias, or those with a sac such as the esophageal hiatus type, are in reality sliding hernias. To repair these successfully it is necessary that the continuity of the sac be interrupted.

Third, ethylene anesthesia administered through a tight fitting mask has been quite satisfactory in our hands. We have not had to employ an intratracheal tube. Except in the esophageal hiatus hernias the lung on the affected side has been collapsed and accommodation to breathing with a reduced pulmonary volume has already been made.

Fourth, preliminary crushing of the phrenic nerve to the affected diaphragm is a necessary adjunct to the surgical repair. For those who advocate the thoracic approach, this may be done at the time of repair.

Fifth, I prefer the abdominal approach as advocated by Harrington in the repair of diaphragmatic hernias in children for several reasons: (a) it may be combined with a thoracic ex-

posure, as would have been necessary in the instance of the child whose history has been given; (b) the abdominal approach in the infant or child affords easy access to the diaphragm under ordinary circumstances; (c) it avoids the danger of respiratory difficulty which may be encountered in young infants whose chests are opened; (d) it allows for the proper reduction of the viscera as they are replaced in the abdomen with less danger of injury; (e) furthermore, it circumvents a difficulty which has been alluded to in a previous paragraph. Even with temporary phrenic paralysis, in children whose hernias have gone untreated long enough to allow for the development of a contracted abdominal cavity, forceful replacement of the viscera in the smaller than normal cavity will produce a pressure effect on the unaffected lung through the liver. With the lungs on the affected side collapsed and expected to expand slowly, anoxemia may supervene and lead to death. This has certainly been the mechanism responsible in cases which I have both witnessed and have seen reported in the literature. In the abdominal approach, after the defect in the diaphragm has been repaired, it is possible for the anesthetist to change from light ethylene anesthesia to drop ether. Relaxation may be obtained which together with manual stretching of the abdominal wall, especially the rectus muscles, will allow for orderly, easy replacement of the viscera and closure without tension.

Sixth, finally these operated children are placed in an oxygen tent and allowed to remain there until their condition is considered satisfactory.

Seventh, they are given fluid, including blood, by intravenous administration begun before the surgical procedure is started.

I feel that if these principles are adhered to, the mortality of 32 per cent as reported by Hartzell in 68 operated cases in children will continue to be reduced.

55 East Washington Street

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DISCUSSION

Dr. Edwin M. Miller, Chicago: Dr. Dorsey has well covered the main points in connection with the problem of diaphragmatic hernia in infants and children. In the type of hernia which we most commonly see, i.e. through the pleuroperitoneal canal on the left side, the diagnosis is often extremely easy, and the treatment likewise may be attended with little difficulty. The prominent chest over which bowel sounds are heard, the area of cardiac dulness pushed to the right, and the flat abdomen, taken together should at once make the diagnosis of diaphragmatic hernia almost certain. When, however, the x-ray film is made and the air containing loops of bowel are seen in this abnormal position, the situation is perfectly clear.

In this case (a boy age 2½ months) when a little barium was given by mouth the stomach could be seen in its normal place, the barium then passed through a defect in the left diaphragm and quickly filled the many loops of small bowel and colon which almost completely occupied the left chest.

The successful treatment in this case was accomplished by means of a combined thoracic and abdominal approach. With the left hand in the abdomen displacing the spleen, the loops of bowel were returned with the right hand through this small triangular shaped defect with very little trouble, and the repair of the defect was readily made with a running catgut suture. The postoperative course was amazingly uneventful, and the x-ray made two and a half years later shows the smooth curve of the diaphragm on the left side.

The important thing to remember is that many of these cases can be diagnosed very easily and if seen early enough and operated on without delay, most of them should live.

Dr. S. C. Henn, Chicago: I had a baby some time ago in whom we diagnosed a diaphragmatic hernia. He was making a good gain in weight and I was getting quite enthusiastic about the way he was getting along, but Doctor Brennemann told me to watch out because these cases are so tricky. The parents were good friends of Harrington's at Mayo's and he agreed that the child was doing well and he decided not to operate. The patient was about a year and a half old. He had a restless spell one night and they picked him up and carried him around to quiet him. The next morning he was irritable; the mother took him to the window where he pointed at something, and within fifteen minutes he died.

We should remember that even if these patients are getting along well, they should not be carried along medically any longer than absolutely necessary; they should be turned over to the surgeon as early as possible.

Dr. E. T. McEnery, Chicago: I feel that there are many cases with a dipahragmatic weakness, as Dr. Dorsey mentioned, in whom a sudden accident may occur at a later date, as Dr. Henn has just described.

I saw a child, age 10 months, with a history of repeated attacks of vomiting, who was in shock from what was diagnosed a spontaneous pneumothorax. The child was sent to the hospital and placed in an oxygen tent. This patient died a short while after reaching the institution. A post-mortem x-ray showed a diaphragmatic hernia with stomach and intestine present in the left thoracic cavity. Even though these cases simulate a pyloric stenosis an x-ray may help to rule out a diaphragmatic hernia.

Dr. John M. Dorsey, Chicago (in closing): I wish to thank the Doctors for their discussions, and I also wish to emphasize the point that diaphragmatic hernias in children are surgical emergencies.

POSTMENOPAUSAL BLEEDING

CLYDE J. GEIGER, M.D.
CHICAGO

The menopause is said to occur when the process of ovulation ceases and this is accompanied by sterility and amenorrhea. This is followed by atrophic changes in the internal and external genital organs. Bleeding which occurs after the climateric has been established, is considered pathological in origin. This condition usually depends upon local atrophic changes incident to the menopause or follows the development of neoplastic disease either benign or malignant.

A study of the causes of postmenopausal bleeding at the Cook County Hospital gynecological tumor clinic was undertaken. There were 395 cases in this group admitted to the clinic from January 1, 1933 to July 1, 1940. This subject was chosen because we have frequently seen bleeding after the menopause improperly interpreted; therefore, we decided to determine the responsible lesion in a series of cases from our clinic. Thus we would be better able to judge the significance of postclimateric bleeding.

The various lesions responsible for postmenopausal bleeding in our cases can be noted in Table I.

The Malignant Lesions: The most frequent lesion which we encountered in this group, as seen in Table II, was carcinoma of the cervix. This occurred in 265 cases, an incidence of 67.0 per cent. 238 of these lesions originated on the vaginal portion of the cervix and 23 were from the cervical canal. In this group there were 5 patients who had had a previous supra-cervical hysterectomy and later developed a carcinoma in the stump. In two of these cases the lesion began in the remaining canal and the other 3 originated on the external portion of the cervix. As to the microscopic findings, there were 13 cases of adenocarcinoma, 6 cases of adenocancroid and 246 cases of squamous cell carcinoma.

Carcinoma of the corpus was found in 34 cases, an incidence of 8.8 per cent. The microscopic diagnosis was adenocarcinoma in 32 cases, and adenocancroid in 2 cases. The combined incidence of cancer of the cervix and body of the uterus for the whole series was 75.8 per cent.

There were 10 cases of carcinoma of the ovary with an incidence of 2.5 per cent. Most of these patients were referred from the hospital for follow-up and radiation therapy. The pathological report was adenocarcinoma in 6 cases, and papillary cystadenocarcinoma in 4 cases.

Table I.

Incidence of Various Lesions Responsible for Postmenopausal Bleeding.

Pathological Lesion	Number of cases	Per cent
Carcinoma of the Cervix	265	67.0
Carcinoma of the corpus	34	8.8
Cervical polyps	29	7.3
Benign	27 — 6.8%	
Malignant	2 — 0.5%	
Fibromyomata	13	3.3
Benign	11 — 2.8%	
Malignant Degeneration	2 — 0.5%	
Cervical Erosions	12	3.0
Senile Vaginitis	11	2.8
Ovarian Malignancies	10	2.5
Carcinoma of the Vulva	6	1.5
Endometrial Hyperplasia	5	1.2
Undetermined Bleeding	5	1.2
Endometrial Polyps	2	0.5
Urethral Caruncle	1	0.3
Carcinoma of the Vagina	1	0.3
Carcinoma of the Bladder	1	0.3
Total	395	100.0

Table II.

Incidence of Malignant Lesions Responsible for Postmenopausal Bleeding.

Pathological Lesion	Number of cases	Per cent
Carcinoma of the Cervix	265	67.0
Carcinoma of the Corpus	34	8.8
Ovarian Malignancies	10	2.5
Carcinoma of the Vulva	6	1.5
Malignant degeneration of Myomata	2	0.5
Malignant Cervical Polyps	2	0.5
Carcinoma of the Vagina	1	0.3
Carcinoma of the Bladder	1	0.3
Total	321	81.3

From the department of obstetrics and gynecology, Loyola University School of Medicine and the Cook County Hospital gynecological tumor clinic.

Read before Section on Obstetrics and Gynecology of Illinois State Medical Society, Chicago, May 21, 1941.

Of the 6 cases of carcinoma of the vulva, 5 originated on the labia and one on the clitoris, an incidence of 1.5 per cent. The microscopic finding was squamous cell carcinoma in all the cases. There were 2 patients with fibromyomata of the uterus in which sarcomatous changes had occurred, and incidence of 0.5 per cent.

Two of the 29 cervical polyps had undergone malignant degeneration, an incidence of 0.5 per cent. This is unusual because these growths are usually benign. One of these cases was referred to the clinic, diagnosed as a malignant polyp by a competent pathologist. The pathological diagnosis was adenocarcinoma in one case and squamous cell carcinoma in the other.

The one case of primary carcinoma of the vagina gives an incidence of 0.3 per cent. This tumor, on microscopic examination, was an anaplastic undifferentiated squamous cell carcinoma. There was also one case of carcinoma of the bladder, an incidence of 0.3 per cent. This was a transitional cell carcinoma.

The total number of cases of malignancy in our series was 321, or 81.3 per cent. This incidence is somewhat higher than the average in the literature, but this is probably due to the fact that we have a cancer clinic. This was also true in Ducuing's and in Albenque's series, whose cases were from cancer centers. The high incidence of malignancy in patients with postmenopausal bleeding, as noted by various authors, emphasized the importance of a careful and complete study for the causative factor. It is only by the early recognition and treatment of malignancy that one can hope to cure this disease. (See Table III).

The Benign Lesions: In the benign group, which comprised 73 cases or 18.7 per cent, cervical polyp was the most common cause of postmenopausal bleeding. (See Table IV). There were 27 polyps, an incidence of 6.8 per cent. If the two malignant polyps of the cervix are added to the above, the incidence for all the polyps would be 7.3 per cent.

Cervical erosions (12 cases) were quite frequent, an incidence of 3.0 per cent. In some of these cases, there was an associated prolapse of the uterus. These lesions were all carefully checked by biopsy. The myomata (11 cases) were chiefly of the submucous type and a few were pedunculated and presented in the cervical canal, an incidence of 2.8 per cent. In 5 cases the etiology of the bleeding was undetermined, an incidence of 1.2 per cent. The pelvic examination was negative as was also a diagnostic dilatation and curettage. Senile vaginitis (11 Cases) with an incidence of 2.8 per cent, hyperplasia of the endometrium (5 cases) with an incidence of 1.2 per cent, endometrial polyp (2 cases) with an incidence of 0.5 per cent, and urethral caruncle (1 case) with an incidence of 0.3 per cent were the other benign lesions causing postmenopausal bleeding. (See Table IV).

Age: The age incidence in this series, on admittance to the clinic, varied from 30 - 80 years. The greatest number of patients were between 51 - 55 years, which was about 30 per cent of the total cases. The age groups from 46 - 50 years, and from 56 - 60 years were quite similar. There was a rapid decline in cases below 46 and over 70 years. (See Table V).

Table III.

Incidence of Postmenopausal Bleeding due to Malignancy.

Author	Year	Per cent Incidence
Ducuing — work done at cancer center	1932	92.0
Albenque — work done at cancer center	1932	91.0
Kanter & Klawans	1932	68.4
Brown	1933	66.8
Schulze	1933	68.0
Geist & Matus	1933	57.5
Norris	1935	52.9
TeLinde	1937	53.3
Geiger	1941	81.3

Table IV.

Incidence of Benign Lesions Responsible for Postmenopausal Bleeding.

Pathological Lesion	Number of cases	Per cent
Cervical Polyps	27	6.8
Cervical Erosions	12	3.0
Fibromyomata	11	2.8
Senile Vaginitis	11	2.8
Endometrial Hyperplasia	5	1.2
Undetermined Bleeding	5	1.2
Endometrial Polyps	2	0.5
Urethral Caruncle	1	0.3
Total	74	18.7

Table V.

Age When First Admitted to Tumor Clinic.

Age Group	Cases
30 to 35	1
36 to 40	10
41 to 45	16
46 to 50	80
51 to 55	115
56 to 60	75
61 to 65	44
66 to 70	34
71 to 75	13
76 to 80	4
Unknown	3
Total	395

Age of Menopause: We found that the menopause occurred in one case at 30 years, while the latest cessation took place at 58 years. The greatest number (178) was in the group between 46 - 50 years. Below 41 and over 55 years the decline was very rapid. There were 11 patients that had had a surgical menopause. In 8 cases the menopausal age was not determined. These patients were usually quite elderly. (See Table VI).

As to parity, 44 were nulliparous and 351 were multiparous. There were 298 white patients and 97 colored.

The type of bleeding was classified as follows: (1) Bloody discharge — present in 34 cases. (2) Spotting — present in 54 cases. (3) Contact or intermittent bleeding — present in 293 cases. (4) Severe bleeding (hemorrhage) — present in 14 cases. About 75 per cent of the patients were included in the third group. (See Table VII).

The duration of the bleeding before seeking medical advice varied from 24 hours to over 2 years, but the greatest number came to the clinic within 1 - 6 months. Within the first year 350 of the 395 cases had been examined. (See Table VIII).

Diagnosis: In our series there were 347 biopsies taken from the vulva, vagina, vaginal portion of the cervix, and cervical canal. In 15 cases the biopsy was repeated once and in 3 cases it was repeated twice in order to establish a proper diagnosis. In 50 of these patients a diagnostic dilatation and curettage was done. 13 cases required an abdominal laparotomy for obtaining a correct diagnosis. In the one case of carcinoma of the bladder a cystoscopic examination with removal of tissue for biopsy was necessary. (See Table IX).

The diagnosis of the various pathological conditions which cause postclimateric bleeding is usually not difficult. A careful bimanual pelvic examination should be done followed by a speculum examination of the vagina and cervix. This will reveal the source of bleeding in many instances. Painting of the cervix with gram's iodine solution (Schiller test), followed by biopsy, may be indicated. Any lesion on the vulva, vagina, or cervix which bleeds should be biopsied and subjected to careful microscopic study. If the cause of the bleeding cannot be determined by the above procedure, a diagnostic dilatation and curettage followed by careful microscopic examination is indicated. While the patient is under the anaesthesia, careful bimanual palpation of the ovaries should be done. In certain cases such as ovarian tumors, an exploratory laparotomy may be indicated. Patients in whom the cause of bleeding cannot be determined, even by careful investigation, should be kept under observation.

Table VI.
Age Incidence of the Menopause

Age Group	Cases
30	1
32	2
34	1
35	10
36 to 40	22
41 to 45	82
46 to 50	178
51 to 55	70
56	7
57	2
58	1
Undetermined	8
Surgical Menopause	11
Total	395

Table VII.
Type of Postmenopausal Bleeding

Type	Character of Bleeding	Cases
I	Discharge with blood	34
II	Spotting	54
III	Contact, intermittent bleeding	293
IV	Severe bleeding or hemorrhage	14
	Total	395

Table VIII.
Duration of Bleeding before admission to Clinic

Duration of Bleeding	Cases
Less than 1 week — (1 case — 24 hours)	16
1 to 4 weeks	58
1 to 6 months	169
7 to 12 months	107
13 to 18 months	20
19 to 24 months	18
More than 2 years	7
Total	395

Table IX.
Incidence of various Diagnostic Procedures.

Diagnostic Procedure	Cases
Biopsy forcep	347
In 15 cases — Biopsy repeated once	
In 3 cases — Biopsy repeated twice	
Dilatation and curettage	50
Abdominal laporatomy	13
Cystoscopy — (Carcinoma of the bladder)	1

SUMMARY

The various etiological factors responsible for post-menopausal bleeding in 395 cases from the Cook County Hospital gynecological tumor clinic have been analyzed. In 81.3 per cent the

pathological lesions were malignant and in 18.7 per cent benign. Carcinoma of the cervix was the most common cause of bleeding after the menopause, occurring with an incidence of 67.0 per cent. Carcinoma of the corpus was present in 8.8 per cent of the cases, giving a total incidence of over 75 per cent for cancer of the uterus. Malignancy of the ovary, vulva, vagina, cervical polyps, fibromyomata and bladder accounted for the remainder, or about 6 per cent. Since postclimateric bleeding in the majority of instances is due to a malignant lesion, a careful investigation of the generative tract should be carried out in all cases. Biopsy, diagnostic dilatation and curettage with examination of the adnexa under anaesthesia, and even an occasional exploratory laparotomy in cases of suspected ovarian tumors may be resorted to. A careful microscopic examination of all tissue removed is indicated. Over one-third of the benign lesions in this series were cervical polyps. Erosions of the cervix, fibromyomata and senile vaginitis were found quite frequently. The age when first seen in the clinic, the age at the menopause, the type and duration of bleeding have been analyzed. In this group, 345 biopsies were taken, 50 patients were subjected to a dilatation and curettage, and in 13 cases abdominal laparotomy was performed in order to establish a proper diagnosis.

104 South Michigan.

DISCUSSION

Dr. F. J. Stewart, Kewanee: Dr. Geiger's very exhaustive paper leaves very little for discussion. We know in the vast majority of these cases as reported by him and other available authors that most cases are malignant. My reaction to this is that we all have a lot of missionary work to do in the field.

The matter of diagnosis is simply arrived at in most cases, but the matter of prevention I believe is a wide field of endeavor. I think we still must do a lot of work postpartum and urge our patients to return for examinations. I am sure you will agree with me that we see a lot of women who take leukorrhea as a matter of incidental consequence to delivery. Since most of these women have had children and since many of these cases show cervical erosions, I think our treatment should be primarily devoted towards prophylaxis. Cervical cautery is a simple procedure. The Schiller test to determine the presence of tissue that should be investigated by biopsy, diagnostic curettage are all methods at our disposal.

This field of postclimacteric bleeding is, as Dr. Geiger pointed out, a most important one and I think probably we should not wait until the climacteric to investigate many of them. We can pick up many in our office examinations in women who come in for some other condition. Complete physical examination, including pelvic and speculum examinations, is most important as we may in this way pick up some cases where they are not showing symptoms. In that way we may save many women who otherwise might die earlier if the diagnosis were not made.

Dr. William Serbin, Chicago: These statistics are very interesting. Dr. Geiger reported on a total of 395 cases, which included 27 benign polyps and 2 malignant ones, or 7.3 per cent of the total series showed polyps; this is higher than my statistics. Irrespective of what he did with his patients, any manner of treatment he may have adopted is not important now, but the important thing is that he looked and he found 29 polyps in that series and he was rewarded in his findings, since two were malignant. That emphasizes the point that I wanted to make in my own paper.

Dr. Clyde Geiger, Chicago (in closing): I do not have much more to say in regard to what Dr. Serbin said. I mentioned that one of these cases of malignant polyp was a case that was sent to us through the clinic for treatment. It had been diagnosed elsewhere, which probably raised the incidence a little higher.

As to Dr. Barrett's discusion, he talked about treatment which was not entered into this paper.

One thing that I would like to emphasize again is that since in all series, carcinoma of the cervix is a very common cause of postmenopausal bleeding and since it is so easy to obtain tissue by the use of biopsy forcep, this method should be employed more frequently.

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TUBERCULOSIS: ITS TWO PHASES OF DEVELOPMENT

CHESTER A. STEWART, M.D., Ph.D.

Studies made chiefly during the past two decades have shown that an introductory series of important changes precedes the development of phthisis, bone and joint tuberculosis and other well known clinical varieties of the disease. These preliminary changes are currently interpreted as comprising the broad primary phase of the development of tuberculosis, whereas the subsequent events which collectively produce the picture of the many clinically serious forms of tuberculosis that occur in man are now classed as representing the second phase of the development of the disease. As a rule these two developmental stages of tuberculosis are separated by relatively long periods of apparent quiescence.

Animal experiments have demonstrated the remarkable capacity possessed by tubercle bacilli to scatter widely throughout the body shortly after the first infection occurs. These observations indicate that the pathology produced by a primary tuberculous infection usually extends far beyond the limits ordinarily assigned to the primary complex, namely the lesions at the site of primary focus and in the regionally related lymph nodes.

Within a few hours after the initial infection is laid down the polymorphonuclear leucocytes begin to focalize the migrating bacilli at the various points to which they have wandered. In this manner the permanent locations of the numerous lesions which comprise the frame work of the primary complex are determined. The neutrophils are the first defense mechanism the body uses in combatting the initial infection.

The second defense mechanism comes into action when the new foci are one or two days old. The agent used at this time is the lymphocyte. These cells collect around the primary foci of disease in large numbers, and gradually become converted with the epitheloid cells of the tubercle. A few monocytes also appear in these areas but their role in the production of tubercles probably is of minor importance. Subsequently the tubercles increase slowly in size and reach histologic maturity in the third or fourth post-infection week.

Throughout this initial period, during which the primary tubercles are maturing, the patient manifests no evidence of disease and has a negative reaction to tuberculin. Proof that infection has taken place has been obtained in a few instances during this initial symptomless stage of the disease by recovering tubercle bacilli from the stomach.

About the time the primary lesions have attained histologic maturity the primarily infected patient develops a transitory fever, and an accelerated sedimentation rate. The initial pre-allergic fever presents no characteristics suggestive of tuberculosis.

A few days after the initial fever makes its appearance, the patient acquires cutaneous sensitivity to tuberculin. This highly specific sensitivity persists for years, and its presence proves the existence of tuberculosis. In fully seventy-five per cent of the patients with tuberculosis in its primary phase of development a positive cutaneous test constitutes the sole evidence of the presence of the disease. These patients present no symptoms suggestive of tuberculosis, and their clinical and X-ray studies fail to disclose the tuberculous lesions which are responsible for their positive reactions to tuberculo-protein.

Information relative to the changes that characterize the primary phase of the development of tuberculosis through the period that post-dates the acquisition of sensitivity to tuberculin is provided by follow-up studies on that minority of patients with primary tuberculous lesions whose size and location make the areas of disease suitable for visualization on X-ray films. In these patients the roentgenographically demonstrable primary pulmonary lesions appear as pneumonic infiltrations on chest plates. These consolidations may be small or they may involve an entire lobe of the lung. As a rule they are unilateral, but occasionally they are bilateral. Repeated X-ray studies usually disclose no gross changes in the character and extent of these shadows for a period of several months. In time, however, the primary lesions commonly undergo a slow but steady decrease in size. Ac-

From the Departments of Pediatrics, Universities of Louisiana, New Orleans and Minnesota, Minneapolis.

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cording to X-ray evidence this process of resolution leads eventually either to a complete disappearance of the infiltration, to its reduction to fibrotic strands, or to its replacement by areas of calcification known as Ghon tubercles. These retrogressive changes usually require two or more years for their gross completion. During the period the spontaneous resolution of large primary tuberculous infiltrations is taking place in the lung the patient usually appears to be well, and physical examinations reveal remarkably few signs indicative of the presence of the disease. Without the aid of the X-ray, the remarkable phenomenon of spontaneous resolution so constantly characteristic of pneumonic infiltrations representing the primary phase of the evolution of tuberculosis, and the gradual development of Ghon tubercles could not have been observed in the living patient. The important contribution serial X-ray examinations have made to our knowledge of that part of the primary phase of the evolution of the disease that immediately follows the acquisition of sensitiveness to tuberculo-protein is obvious.

The reparative changes observed to occur regularly in the large and easily demonstrated primary pneumonic lesions probably exemplify the changes that characterize the remaining primary foci of disease which escape roentgenographic visualization. In the absence of evidence to the contrary, I am of the opinion that all lesions representing tuberculosis in the primary phase of its development have a strong tendency to resolve, to fibrose, and to calcify. These reparative changes probably continue on a microscopic scale throughout many years.

The approximate chronologic order of the series of changes which comprise the picture of the primary phase of the evolution of tuberculosis as I understand it at the present time can be outlined briefly as follows:

1. The first infection with virulent tubercle bacilli.
2. The prompt migration of bacilli to nearby and remote organs and parts of the body.
3. The entry of tubercle bacilli with the gastro-intestinal tract.
4. The localization of bacilli at multiple points by the neutrophils.
5. The accumulation lymphococytes around these foci of disease and their subsequent conversion into epitheloid cells.
6. The histologic maturation of the primary tubercles in the first post-infection month.
7. The appearance, at the end of the symptomless incubation period, of the transitory initial or pre-allergic fever and increased sedemination rate.
8. The acquisition of sensitivity to tuberculo-protein.
9. The development in a minority of the cases of primary lesions of sufficient size to cast shadows on X-ray films. In the majority these lesions escape detection by X-ray study. Their presence is disclosed, however, by the positive skin reaction to tuberculin.
10. The roentgenographically demonstrable primary lesions remain stationary in extent and gross appearance for several months.
11. Extensive infiltrations produce remarkably few clinical or physical signs.
12. The slow resolution of the pneumonic infiltrations which process commonly leads to their reduction to relatively trivial fibrosed or calcified deposits which may or may not be revealed by X-ray study.

This brief outline presents the concept of the primary or broad introductory phase of the evolution of tuberculosis I have gained from the literature and from studies made over several years on children in whom I have had the opportunity to observe the transition from uninfected to the infected state and to trace the subsequent course of the disease. The information I have obtained from these sources convinces me that tuberculosis would be a disease of minor importance if it never progressed beyond its primary phase of development. Unfortunately the disease enters the second of its two broad phases of development in many patients in whom it then produces chronic pulmonary tuberculosis and phthisis, destructive bone and joint tuberculosis, or other well known serious clinical forms of the disease depending on which organ or tissue is involved.

Follow up studies I have conducted over several years on children have given me the opportunity to witness the development of tuberculous pulmonary infiltrations in the lungs of patients who had been sensitive to tuberculin for several years, and whose earlier chest films were repeatedly normal or revealed the old calcified or fibrosed remains of their primary disease. The intervals during which these tuberculin sensitive patients with primary tuberculosis were traced before the second or reinfection pulmonary lesions made their roentgenographic appearance varied from one to sixteen years. These new tuberculous lesions, whose appearance post-

dated the acquisition of sensitiveness to tuberculin by months or years, failed to display a consistent tendency to revolve. Instead they were usually inclined to spread, to cavitate, and to cause illness and death. In general their course was diametrically opposite to that usually pursued by the primary tuberculous infiltrations. In many important respects the contrast observed between the primary and the reinfection phase of pulmonary tuberculosis is very pronounced.

The careful atopsies reported by Rich and McCordock show that tuberculous meningitis results from the escape of tubercle bacilli from older lesions situated in brain or adjacent structures. According to these studies an antecedent infection which produced intra-cranial tubercles and the subsequent escape of bacilli from these lesions are the steps which lead to the development of tuberculous meningitis. In my opinion, therefore, this form of the disease represents the second or post-primary phase of the development of tuberculosis in the central nervous system. In these cases the primary phase of the disease is represented by the tubercles that eventually give rise to tuberculous meningitis. In a few instances I have observed the development of tuberculous meningitis in patients whom I knew had been sensitive to tuberculin for many months. These observations support the view that tuberculous meningitis represents the second phase of the evolution of tuberculosis involving the central nervous system.

Bone and joint tuberculosis is a well known clinical condition but comparatively little attempt has been made to determine whether it represents the primary or the reinfection phase of the evolution of tuberculosis. X-ray studies of the chest taken at the time that symptoms of osteo-articular tuberculosis made their initial appearance frequently disclose calcified intrathoracic deposits which have all the characteristics of Ghon tubercles and calcified hilus glands. These calcified tuberculous lesions are at least two years old, for considerable experience has shown that about the length of time is required for the primary complex to become well calcified. Their presence unquestionably ante-dated by months the development of symptoms caused by bone and joint tuberculosis. This circumstantial evidence provides a very strong indication, therefore, that an antecedent primary tuberculosis preceded bone and joint involvement in these cases.

In order to prove that osteo-articular tuberculosis exemplifies the second phase of the evolution of tuberculosis in this special part of the body complete follow-up data are required. This requirement includes knowledge relative to the time the transition from the uninfected to the infected state occurred combined with subsequent follow-up studies which disclosed the course of the resultant primary disease and established the approximate time the bone and joint involvement took place.

Although osteo-articular tuberculosis is becoming rare in Minnesota I have occasionally had opportunity to witness the development of this clinical variety of the disease in patients who were known to be sensitive to tuberculin for considerable periods before any evidence of bone and joint disease was noted. In one case the acquisition of sensitivity to tuberculin occurred at the age of 17. This was followed shortly by the development of bilateral pneumonic infiltrations which subsequently resolved and left numerous Ghon tubercles. This patient was in excellent health throughout a period of five years following her first infection during which her primary disease resolved and calcified. At the end of this period, however, she developed tuberculosis of the lumbar spine.

This and other similar experiences, combined with circumstantial evidence provided by the frequent finding of Ghon tubercles and calcified hilus glands in patients with bone and joint tuberculosis lead me to believe that this clinical form of the disease represents the second or post-primary phase of the evolution of tuberculosis involving the skeletal system.

Considerable evidence is available which indicates that clinical tuberculosis of the pleura, the peritoneum, the urogenital tract, and of the gastro-intestinal tract also represent the second phase of the evolution of tuberculosis materializing in different specialized tissues. In a fundamental respect, therefore, these clinical varieties of the disease probably are analogous to chronic pulmonary tuberculosis, tuberculous meningitis and osteo-articular tuberculosis. These clinical varieties of the disease give the complete picture of the second developmental phase of tuberculo-

sis a complexity which contrasts sharply with the relative simplicity that characterizes the primary phase of the development of the disease.

Fortunately, in the majority of infected patients, tuberculosis never progresses beyond the primary phase of its evolution. In these patients a positive reaction to tuberculin plus X-ray evidence of primary lesions in some instances provides proof of the presence of the disease. It is from this group with primary tuberculosis, however, that all cases with clinically serious tuberculosis are derived, and each time this occurs in man an antecedent infection with tubercle bacilli has failed to prevent tuberculosis. Nevertheless many investigators believe a contamination of this character is a beneficial immunizing experience. I am of the opinion, however, that these contaminations cause tuberculosis instead of preventing it, and I firmly believe that the eradication of the disease rests exclusively upon the prevention of infection with tubercle bacilli.

An ideal program for eradicating the disease probably should include the following steps.

1. Apply tuberculin tests to the entire population.
2. Make clinical, laboratory and X-ray studies on each patient with a positive reaction to tuberculin.
3. Segregate each patient with open tuberculosis until the condition is no longer contagious.
4. Repeat this type of survey periodically.

Unfortunately this ideal program is an expensive one. Its cost prevents its universal application. A definite need exists, therefore, for *devising an economical alternative for the ideal* plan for eradicating tuberculosis which can be *launched throughout the United States.* Perhaps the following plan meets this need to a considerable degree.

(1) Apply tuberculin tests to the entire personnel of each household unit.

(2) Make no additional studies on the tuberculin sensitive adults if the junior members of the household react negative to the tuberculin test. Under this plan the failure of children to react positive to the test is accepted as evidence their tuberculin sensitive adult associates are not serving as sources of contagion.

(3) Concentrate the more expensive clinical, laboratory, and X-ray studies on the tuberculin sensitive members of the household units in which infected children are discovered. This procedure focuses expenditures close to sources of contagion.

(4) Repeat this type of survey periodically.

This economical plan for eradicating tuberculosis can be used in private practice, and I recommend its adoption by all practitioners of medicine if limited local financial resources prevent the more expensive ideal program.

SUMMARY

1. Two broad phases of development characterize the complete evolution of tuberculosis. Many of the changes that occur in each of these two developmental stages of the disease can be observed during the life of the patient.

2. The chronologic sequence of the known changes that comprise the primary phase of the development of tuberculosis probably is as follows:

The initial infection, the prompt dissemination of organisms to various parts of the body, the focalization of these wandering bacilli at numerous points by neutrophils, the aggregation of lymphocytes around the primary lesions, the conversion of lymphocytes into epitheloid cells, the subsequent histologic maturation of the primary tubercles, the development of the preallergic transitory fever and the acquisition of sensitivity to tuberculo-protein, the gradual resolution of the primary lesions which process gradually reduces them to relatively trivial calcified or fibrosed deposits.

3. As a rule tuberculosis never progresses beyond this primary phase of its evolution.

4. The second phase of the evolution of the disease materializes in a small per cent of the patient with tuberculosis in its primary stage of development.

5. The second phase of the evolution of tuberculosis is exemplified by phthisis, tuberculosis of serous membranes, osteo-articular tuberculosis and various other clinically serious forms of the disease depending on which organ or part of the body is involved.

6. A positive tuberculin test discloses the presence of tuberculosis but does not reveal which stage of evolution the disease is in. Clinical, X-ray and laboratory studies are required for determining this point.

7. The only method by which tuberculosis can be prevented is by preventing infection with virulent tubercle bacilli. Two plans for eradicating the disease are given in outline form.

THE PROBLEM OF CHRONIC ALCOHOLISM IN STATE HOSPITALS

RUDOLPH G. NOVICK, M.D.
Manteno State Hospital
MANTENO

Alcoholism has been described as one of the three great diseases in a recent publication by Dr. K. H. Bowman.[1] The alcoholic problem has become one of the major perplexities of our civilization and as such merits a careful study of its economic, political, sociological and psychiatric aspects. As members of the medical profession we can most profitably limit our present discussion to the psychiatric phase of the problem.

The intemperate use of alcohol is among the most important factors responsible for the ever increasing State Hospital population. Chronic alcoholism appears as a prominent etiological factor in approximately twenty-five per cent of all admissions to hospitals and the alcoholic psychosis represents five to ten per cent of all psychoses of first admission. "It has been estimated that first admissions for alcoholism has increased by 700 per cent between 1920-1930, by 117 per cent between 1930-1934, and that it has increased steadily since that time."[2]

In 1938 the alcoholic psychoses accounted for 4.5 per cent of all first admissions to hospitals for mental disease in the United States, and in addition 6.9 per cent were patients suffering from alcoholism without psychosis. The magnitude of the problem is well portrayed by the following statistics from the United States Census Bureau.

Table 1

First Admission Rates for Alcoholism With and Without Psychosis to All Institutions for Mental Diseases in the United States

	Alcoholism (With psychosis)		Alcoholism (Without psychosis)	
Year	Number of Patients	Rate/100,000 of the general population	Number of Patients	Rate/100,000 of the general population
1922	2,693	2.5	No figures	available
1933	4,651	3.7	4,202	3.4
1934	4,762	3.8	6,271	5.0
1935	4,883	3.8	6,487	5.1
1936	5,274	4.1	7,813	6.1
1937	5,639	4.4	8,453	6.6
1938	4,913	3.7	7,575	5.8
1939	4,773	3.6	7,458	5.7

A similar trend has been noted in the State of Illinois. "There were 604 first admissions with alcoholic psychosis in 1939 as compared with 518 in 1938. Since 1922 the number of first admissions has fluctuated quite unevenly from year to year, but the general trend has been upward. A sharp and upward trend has occurred from year to year since 1932 when the number of first admissions with alcoholic psychosis was less than one-half the number received in 1939. Since 1933 the group with alcoholic psychosis

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ALCOHOLICS (FIRST ADMISSIONS) IN ILLINOIS STATE HOSPITALS[3]

	With psychosis			Without psychosis			Total		
Year	No. of Pts.	Rate/100, 000 total population	Per Cent	No. of Pts.	Rate/100, 000 total population	Cent	No. of Pts.	Rate/100, 000 total population	Per Cent
1922	252	3.8	6.6						
1923	422	6.2	10.8						
1924	296	4.3	8.6						
1925	249	3.5	6.8						
1926	298	4.2	8.3						
1927	320	4.4	8.7						
1928	399	5.4	10.1						
1929	388	5.2	9.7						
1930	340	4.5	8.0						
1931	392	5.1	9.0						
1932	288	3.7	7.1						
1933	300	3.8	6.7						
1934	376	4.8	8.3	232	2.9	25.0	608	7.7	10.1
1935	395	5.0	8.6	263	3.3	29.6	658	8.3	10.9
1936	478	6.1	8.6	294	3.7	43.1	772	9.8	12.3
1937	462	5.9	8.5	412	5.2	36.3	874	11.1	13.1
1938	518	6.5	9.0	524	6.5	37.0	1042	13.3	14.4
1939	604	7.6	10.5	585	7.3	36.8	1189	14.9	20.6

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2. Medico-Legal Notes: The Committment of Alcoholics to Medical Institutions: Quart. Jr. on Alc. 1:2:372-387, Sept. 1940.
3. Annual Statistical Review, Ill. Dept. of Public Welfare 1934-1939.

TABLE 3

CLASSIFICATION OF ADMISSIONS 1939-40

Classification	With Psychosis Males	Females	Total	Without Psychosis Males	Females	Total	Total Males	Females	Total	Percent
Alcoholics	189	29	218	71	24	95	260	53	313	25.08
Dem. Praec.	155	153	308	—	—	—	155	153	308	24.67
G. P.	—	—	—	—	—	—	74	27	101	8.09
Senile.	35	48	83	—	—	—	35	48	83	6.65
Man. Dep.	25	57	82	—	—	—	25	57	82	6.57
Cer. Art.	42	36	78	—	—	—	42	36	78	6.25
Neurosis	—	—	—	13	17	30	13	17	30	2.40
Ment. Def.	15	9	24	3	3	6	18	12	30	2.40
Drug. Add.	—	—	—	17	13	30	17	13	30	2.40
Involl.	8	19	27	—	—	—	8	19	27	2.16
Deferred	—	—	—	—	—	—	19	3	22	1.76
Others	57	44	101	19	24	43	95	71	166	11.53
						TOTAL	742	506	1248	100.00

has become increasingly prominent among the other psychotic groups, representing 10.5 per cent of all first admissions in 1939. First admissions with alcoholic psychosis were received in 1939 at a rate of 7.6 per 100,000 general population, continuing the increasing trend shown during the past years."[1]

Another interesting fact disclosed in this table is the upward trend in the number of first admissions of alcoholics without psychosis. In 1934 the alcoholics constituted 25.0 per cent of all first admissions without psychosis and in 1939 they constituted 36.8 per cent.

In an attempt to make a survey of the problem, a study of the admissions to the Manteno State Hospital during the fiscal year of 1939-1940 was made. During this period of time there were 1248 admissions. Table 3 gives the classification of these patients.

Of the total number of admissions, 313 or 25.08 per cent were alcoholics. These were classified as shown in Table 4.

The percentage of cases classified as with psychosis is alarmingly high. Comparing these figures with those of other institutions in the state makes evident the necessity of arriving at a common definition of the term "deterioration." Thus, at the Elgin State Hospital, where the term is used in its narrow psychiatric meaning we find that during 1938 there were 273 alcoholics admitted with only 62 or 22.3 per cent classified as with psychosis; in 1939 there were 260 alcoholics admitted and only 71 or 27.3 per

1. Annual Statistical Review, 1939. Dept. of Public Welfare. Page 29.

TABLE 4
CLASSIFICATION OF ALCOHOLICS

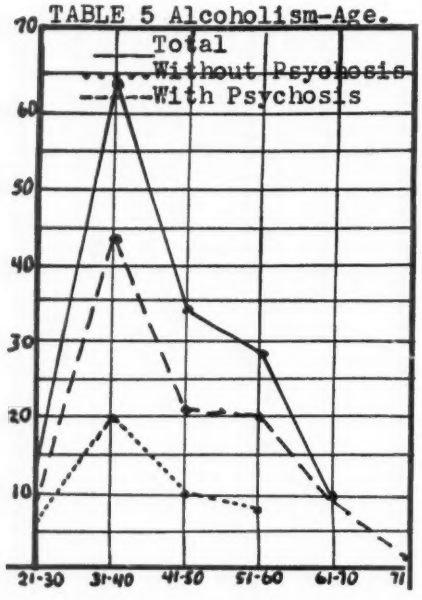
	Males	Females	Total	Per Cent	
Without Psychosis Chr. Alcoholism	71	24	95	30.35	
Alc. Psch. Alc. Det.	122	14	136	43.45	
Alc. Psych. Del. Trem.	34	3	37		
Alc. Psych. Acute Hal.	15	5	20		69.64
Alc. Psych. Paranoid	8	3	11	26.19	
Alc. Psych. Path. Intox.	5	2	7		
Korsakow Psychosis	1	2	3		
Other Alc. Psych.	4	0	4		

cent were classified as with psychosis. This, then, is the first matter that requires more careful consideration.

Without any attempt at selection the first 150 alcoholics admitted were studied with reference to the frequency of admissions, the number of re-admissions, the period of hospitalization, the duration of the periods between admissions, and the age, race, and sex of the alcoholic patient.

The average alcoholic patient is a white male 31-40 years of age who has been drinking for 10-20 years and has had three or four re-admissions. Of the cases studied there were only 29 women and only 14 colored patients, with a proportion of four to one and ten to one respectively. In Table 5 we have the relationship of age to alcoholism. It is interesting that in the group studied, the average age of the patient with

psychosis is ten years above that of the patient classified as without psychosis. In the former case, the average age is forty years and in the latter, thirty years. Horatio M. Pollack states, mental disease follows only many years of drinking (for males 22 years, and for females 15 years), which suggests the possibility of checking the habit and averting mental disease.



In this series of cases there were eighty first admissions and seventy re-admissions. The number of re-admissions ranged from one to seventeen and averaged four per patient. The number of re-admissions was not as large as might have been expected and this might point to the fact that alcoholics do not return as frequently as is the general consensus of opinion. Careful statistics are necessary to clear up this point.

The period of hospitalization ranged from a few days to almost a year and averaged one to three months. This is in marked variance with the total hospital population where 85 per cent of all the patients, 80 per cent of the psychotics, and 96 per cent of the non-psychotics who are discharged have been in the institution less than one year; as compared with the alcoholics were 93 per cent of all alcoholics, 87 per cent of the alcoholic psychosis, and 98 per cent of the alcoholics without psychosis who have been discharged had been in the institution less than one year. This factor accounts for the small number of alcoholics in the institution at any one time.

The provision for the treatment of chronic alcoholism is inadequate in practically all parts of the United States. In many places the drunkard is arrested, placed in jail, sobered up, fined, and then released. In most cases such a procedure is not only useless but harmful, in that the atmosphere of jail tends to dissipate ethical resistance to drunkenness.

In many large cities conditions have been somewhat improved by the admission of some of the alcoholics to public hospitals. Here the patient receives treatment directed towards an improvement of his physical condition and as a rule these hospitals do a good job as far as the immediate attack is concerned.

The trend, at the present time, has, for various reasons, been towards the admission of such cases to state institutions. Here, as in the public hospitals in the city, the treatment has been directed largely towards the physical well being of the patient. In addition, however, an abortive attempt has been made to treat the underlying factors by means of hydrotherapy, occupational therapy, industrial therapy, and psychotherapy to a very limited extent. The results, however, have been almost uniformly poor. Although a large number of patients are discharged after treatment a large number of them shortly resume their alcoholic habit and return to the institution.

Reasons for the failure of the state institutions to successfully cope with the problem of alcoholism are readily apparent to anyone who has made a study of the subject. The failure is due to a variety of causes. Among them there are factors which are inherent in the very nature of the hospital as a psychiatric institution for the care and treatment of psychotic individuals and as such cannot fully fulfill the requirements necessary for the rehabilitation of the alcoholic whether he be classified as with or without psychoses. The alcoholic patient should be in a place where he can lead as normal a life as possible and where association with other patients will facilitate adjustment to society.

Secondly, the alcoholic patient is not psychotic in the same sense as is the patient suffering from dementia praecox, manic depressive psychosis

and the other psychoses. His difficulties have different causative factors, his condition runs a different course and requires an entirely different form of treatment.

Thirdly, the medical staffs of our various state institutions are not suited for the care and treatment of the alcoholic patient. Their interests are primarily with the psychoses and a re-orientation of their interests cannot be easily changed. Their past experiences with the alcoholic patient have not facilitated such a re-orientation. The frequent and regular re-admission of the "recovered" alcoholic have instilled a feeling of inadequacy amongst the staff members who then adopt an attitude of resignation or even exasperation and hostility and "solve" the problem by "assigning the patient to the coal detail," or by assuming an indifferent attitude towards him and proceeding to forget all about him and his difficulties.

From this it is evident that a different approach to the problem is necessary. Recourse to current articles, however, throws little light on the subject. The literature on the treatment of alcoholic addiction is lagging numerically and in importance behind the literature pertaining to therapy of specific manifestations of alcoholism. We must view the subject as a whole and treat it as such, for the treatment of a specific manifestation is the treatment of a symptom with entire disregard for the disease process as a whole.

What then is the solution of this increasingly important problem? After serious consideration, careful perusal of the literature, and deliberate discussion of the subject with others interested in its solution, the author has the following suggestion to offer. The idea is not a new one, but it deserves much more serious consideration than it has received in the past.

Separate institutions for the care, treatment and study of the problem of alcoholism must be erected. Such institutions will immediately do away with the objections which have been raised against the care of the patient in a State hospital. Here the medical staff and attendant personel will be chosen because of their interest in the problem, the institution will arrange its routine according to the needs of the alcoholic patient and not merely treat him as an unwanted byproduct, and the patient will find himself in an environment which is more friendly, more understanding, and more heedful of his difficulties.

The care of the patient should be divided into three phases; in the first phase, the treatment is to be directed towards the restoration or preservation of the physical well-being of the patient. The institution of a proper diet with a sufficient vitamin intake, the alleviation of excitement and procurement of sleep, and general medical and nursing care of the patient constitute this portion of the treatment.

The second phase of the treatment is concerned with the underlying cause of the alcoholic habit. Where the alcoholism is found to be a symptom of some disease, mental or physical, the treatment is that of the underlying disease. Where the alcoholic habit itself is in the forefront, the chief line of attack is a thorough investigation of the factors of the patient's life and personality, a study of his thoughts, emotions, and reactions and a judicious use of the findings as the material of the therapy with an attempt to teach him to replace his weakness with whatever assets he may possess. Though no thoroughly satisfactory ways of treating the ordinary chronic alcoholic are now existent, the concensus of opinion is that psychothreapy affords the best possibilities of recovery. This psychological approach will, in itself, be a therapeutic measure. It will be a revelation to the patient, whose habit, until now, had always been regarded by his friends as evidence of moral torpitude and who himself has come to regard his alcoholism as mysterious and inevitable.

Individual and group psychotherapy can be used adventageously in such institutions. By the former method the individual's own problems may be brought to the fore and the patient given an insight into his mental condition, and by the latter method the patient may be given an understanding of the social aspect of the problem.

As important adjuncts to the psychotherapy, carefully planned and carefully directed industrial, occupational, and recreational therapy should be instituted with the object of socializing the patient and preparing him for his future life outside of the institution.

The third phase of treatment is the prepara-

tion of the environment for the reception of the patient. The social service department will play the leading role in this phase of treatment. It will investigate the possibilities to secure work for the patient before he is allowed to leave the institution. The patient will have been prepared, during the second phase of the treatment to regard the hospital and personel as his friends and will be encouraged to return to the institution to consult the psychiatrist at any time that he feels the necessity for advice and counsel.

SUMMARY

Alcoholism is gradually and steadily forging its way to the fore as the numerically most important problem in the state hospitals. In Illinois the number of first admissions with psychosis has shown a sharp upward trend since 1932 and in 1939 constituted 10.5 per cent of all first admissions with psychosis.

From this study the following facts are evident:

1. That alcoholism is an important psychiatric problem which has been much neglected by the psychiatrist.
2. That the state hospital has failed to cure the alcoholic or learn much about the problem of alcoholism.
3. That there is no relationship between the length of the period of hospitalization and the duration of the period between admissions. Such a finding indicates that *under the present regime* it is not advisable from either a psychiatric or economic point of view to keep the patient in the hospital longer than absolutely necessary to relieve the alcoholic of his acute symptoms and to restore his physical health. Under the suggested plan, however, such is not the case.
4. That time favors the psychiatrist since mental disease follows only after many years of drinking and in the series of cases studied this is a ten year period.

As a result of this study, the following suggestions present themselves:

1. A change in our attitude — we must come to recognize and regard alcoholism as a disease and treat it as such.
2. A common system of classification must be adopted and a unified and recognized technique of dealing with the problem must be worked out.
3. Separate institutions should be erected for the care and treatment of the alcoholic and the study of the problem of alcoholism. Such an institution, adequately staffed and properly equipped can take advantage of the ten year period prior to the onset of the psychosis and thus avert mental disease resulting from chronic alcoholism.

750 S. State Street
Elgin, Illinois

DISCUSSION

Dr. Charles F. Read, Elgin: I have met with many alcoholics for many years and feel inadequate to discuss this subject with the idea of bringing to this group any valuable contribution over and beyond what our essayist has already given you.

The other day a man called himself to my attention who had been an institutional alcoholic four years ago, has not taken anything since and has returned to his profession which he is now following successfully. He said to me, "You know, I don't drink, but every now and then something up here (indicating his head) bothers me, and I want to take a drink." So, here is a man in good healh, who knows what the penalty would be if he should drink, and yet I am afraid this little imp "up here," now that he knows alcohol will take him away from his problems for a while, will sometime cause him to drink again.

The essayist has indicated very plainly the increase of alcoholics admitted to our state hospitals, where they are not welcome because their treatment is unsatisfactory, and because there are so many other things for the doctors to do that seem to be more worthwhile than the inadequate treatment we can give these patients.

The fact is that the alcoholic as we know him — call him "chronic inebriate" if you please — is a peculiar phenomenon. In what direction does this peculiarity lie? The doctor stated that his psychosis, or psychiatric problem is not such as we see in schizophrenics and others with whom we deal in large groups. What sort of a person is he then? Dr. Phyllis Wittman has made quite a study of a number of these people and out of her work has come the finding that the alcoholic, as we see him, is a society problem. He is a weakling. He has not developed a well integrated personality with an idealogy that will hold him, in spite of temptations to misdirect his life and to tangle up his life pattern as it were. It seems that these persons are commonly those who have been dependent upon mother, "suckling," if you will, or have been limited more or less by a father who was

too strict. At a recent national medical meeting I attended a symposium on the chronic alcoholic and after two papers were read I left in disappointment because nothing had been said that would add anything to our knowledge. One of the essayists described the alcoholic according to various traits that have been attributed to him, and read off many traits that you and I possess.

The essayist has suggested other institutions. A nice idea, off-hand! But when are we going to stop building institutions to supply the demands of our various welfare organizations in order to make life comfortable for everybody. That is what the alcoholic wants — an easier life. He wants to get away from his discomforts, so he drinks; and when he becomes a discomfort to the community, we put him in an institution. It is a vicious circle; possibly sometime the last man will enter, throw the key over the wall, and we shall all be institutionalized.

So far as psychotherapy is concerned, that is fine — if we know how to use it. I know the alcoholic can be converted religiously; or, in the wider sense of the term, suffer a conversion by realizing that it is better for him not to drink. Then he is cured — for the time being.

In research, much can be done to ascertain what sort of a somato-psychic organization the "chronic inebriate" represents. Are his faults due to faulty physiological adaptation, or is he actually psychotic? I question whether he is a psychotic as we are accustomed to dealing with them. We imprison those who go into a house to steal, and for those who deliberately drink alcohol to steal away their reason we recommend hospital institutionalization. These people, we say, are "sick." You might say that all those who don't do well and who have not established a life pattern that will carry them along decently in life to their own comfort and that of the group in which they live are also sick.

I would suggest also a study of recovered alcoholics — those who at least have been stabilized for three to five years — to see what helped them to reform, what were the factors contributing to their reinstatement. Were they primarily a better sort of people than those who have failed so persistently and so constantly?

Dr. George Rooney, Joliet: I believe that this problem would go right back to the physicians who are in private practice. Most of us in private practice, especially in general hospitals, want to get rid of our alcoholics just as fast as possible. For this reason I believe that we could educate the private practitioner into holding the alcoholic who is acute in a general hospital for a short time until we definitely have the idea that he is psychotic, and then he must be placed in an institution for the proper care. I feel that a great deal can be accomplished in that way. It is my idea that most men fear the psychiatrist for some reason, and for that reason they immediately think it is easier to get a commission together and send him away to a state hospital where he stays for a short time and then goes right back into the general public.

Dr. D. L. Steinberg, Elgin: Several approaches to the problem of chronic alcoholism could be attempted, even under our limited facilities at the present time. Erection of new institutions require more money and more staff members, but meanwhile there could be established a unit in any one of the state hospitals for the study and treatment of alcoholic patients, rather than wait until the State can find sufficient funds to set up a separate institution.

There is one statement I would not subscribe to. That is that alcoholism is a separate study from psychiatry and should not be part of the state hospital physician's domain. I think that the day of state hospitals being known as custodial institutions for chronically ill mental patients is gone, and we should do nothing to encourage its return.

Dr. R. Novick, Manteno (closing): Time does not permit either a discussion of the ramifications of this problem, important and interesting though they may be, or the addition of facts which will support the main thesis of this paper.

Relative to the financial aspect of the problem, which has been raised by the discussants, I wish to point out that though the immediate outlay for the erection and equipment of such an institution may be considerable, the plan, from a long term point of view, is financially sound.

The setting up of a separate unit within the state hospital would not involve the expenditure of any money, but at the same time it would not remove the alcoholic from an environment which does not facilitate a cure or lead to a change in the attitude of the hospital personnel towards the alcoholic. These basic difficulties of the present set-up would still be with us. The plan is an improvement over existing conditions, but is merely a compromise, a compromise which I cannot full-heartedly endorse.

I wish to thank the discussants for their remarks and regret that Dr. Baer could not be with us today.

AND SO TO BED

Some time ago I saw an article in the paper about an old gentleman in North Carolina who had had a cardiac attack. This problem, as we well know, is sometimes difficult. It is hard to tell how to treat them. This old gentleman was 90, and was married to a lady of 28, and had a child two and one-half years old. Six months before he had this cardiac attack he had another child. The doctor said he was doing pretty well and they thought he would recover. It occurred to me that this case presented a problem in treatment — whether to keep this old gentleman out of bed or in bed.—*Dr. Francis R. Hagner, M.D., Transactions of the Southern Surgical Association, 1937.*

THE ELECTROCARDIOGRAPHIC CHANGES OBSERVED DURING ARTIFICIALLY PRODUCED CONVULSIONS

ALAN A. LIEBERMAN, M.D.
AND
ERICH LIEBERT, M.D.
From the Elgin State Hospital
ELGIN

Studies on the circulation before, during, and after convulsive seizures have been carried out by various investigators. Pollack and Treadway[1] found that "certain circulatory and respiratory changes occurred in relation to an epileptic convulsion," the blood pressure rising from 26 to 60 seconds prior to convulsion, while from "nine to twelve seconds immediately preceding the seizure, a sudden marked drop in blood pressure occurred, remaining relatively low during the time occupied by the petit mal attack."

It has already been established that agents employed in the production of artificial seizures, are known to have a marked excitatory effect on the central autonomic nervous system (Gruenwaldt[2]). Pollock and Holmes[3] found a periodic rise and fall in blood pressure, occurring during a picrotoxin convulsion, but apparently having no definite time relationship to it. Stimulation of the autonomic nervous system during metrazol convulsions was reported by Gellhorn,[4] Heilbrunn and Liebert[5], and Masserman[6] was able to demonstrate a direct rise in blood pressure by direct topical application of metrazol to the region of the hypothalmus.

Because of the clinically frequent use of metrazol in the production of artificial convulsions, it was considered advisable to make a more detailed study of its effects upon the circulatory system with particular reference to the electrocardiographic changes that may be brought about. Himwich[8] has carried out metrazol experiments in dogs and has reported a marked prolongation of the PR interval, a partial heart block and early T wave changes; these disturbances remained unchanged even after bilateral vagotomy and ganglionectomy but disappeared following the administration of oxygen. Quite recently Kline, Fetterman,[12] and Pellens,[13] have described severe conduction disturbances occurring in man following a convulsion and suggested that the pace-maker changes were due either to a powerful vagal stimulation or secondarily due to the mechanical effort of the seizure upon the heart. Bellet and Kershbaum[14], using electric current as a convulsant, observed severe electrocardiographic disturbances in 66% of their cases.

In the above cited experiments, muscular interferences prohibited the recording of an electrocardiogramh during a convulsive seizure. The earliest electrocardiographic changes can only be observed in a completely immobilized animal, which would also have the advantages of excluding the effects upon the myocardium of any metabolic disturbances.

In the following experiments, the animals were completely immobilized by either curare or ether narcosis, and in this manner, an undisturbed electrocardiographic tracing could be taken from the very onset of the injections of the various convulsants.

Method and Material: Tracheotomy was performed on rabbits weighing about 3,000 grams, under light ether anesthesia for the purpose of induction of artificial respiration. After the effect of the ether had worn off, 10 c.c. of a .1% solution of curare (Merck) was administered intravenously, until a complete paralysis of voluntary and respiratory muscles was obtained. The above is sufficient to paralyze the animal, but will allow the animal to recover after a few hours. Metrazol was then administered intravenously in doses varying from 0.3 c.c. to 0.7 c.c. of a 10% solution. Electrocardiographic readings were taken prior to, during, and after the administration of each drug employing the use of lead CF_4* or the conventional lead II.

In another experiment deep ether narcosis was used for the immobilization of the animal. Tracings were taken before, during, and after deep narcosis (absent corneal reflexes). Metrazol was administered during this narcosis and continued action current of the heart was then recorded. In order to compare the action of metrazol with other convulsants, thujon was used in another series of experiments.

Presented before the Physicians' Association, Department of Public Welfare, State of Illinois, 101st Annual Meeting, Illinois State Medical Society, Chicago, May 20, 1941.

*Standardization of precordial leads by the American Heart Association, J.A.M.A. 110: 682, 1938.

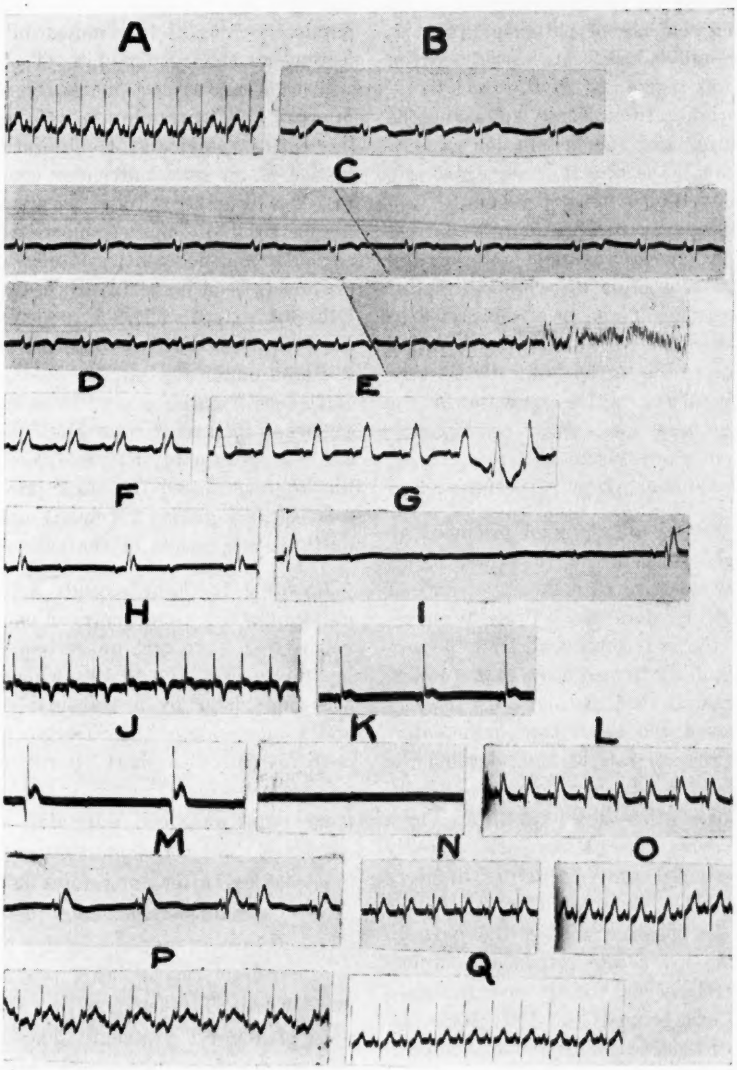


Figure 1: (A) Normal control; (B) During curare injection, slowed rate due to artificial respiration; (C) 0.3 c.c. of metrazol, followed in six seconds by tachycardia, prolonged PR, inverted T and later somatic tremor; (D) 12 minutes later, high ST take-off with shortened QT interval; (E) curare producing transient bundle branch block; (F) 0.4 c.c. metrazol converting (E) into a 2:1 intraventricular block; (G) 0.5 c.c. metrazol producing 5:1 block; (H) 0.7 c.c. metrazol showing tachycardia, ST elevation, and cove-shaped inverted T wave showing electrical alternans; (I) 65 seconds later showing return except for deep Q wave; (J) acute asphyxia showing 2:1 block, deep Q, elevated ST segment, short QT interval; (K) ventricular standstill, auricles beating at rate of 80; (L) 0.7 c.c. of metrazol showing immediate tachycardia, absence of ST segment with appearance of intraventricular block, and deep Q; (M) 25 seconds later showing varying PR intervals; (N) 4 minutes later, restored to normal; (O) normal control for ether narcosis; (P) 70 seconds after 0.3 c.c. during which animal has awakened, showing depressed ST segment, and the inverted T waves showing electrical alternans; (Q) return to the normal control at conclusion of the experiment.

Results: The control electrocardiogram in all cases showed no evidence of pathology (Fig. 1, A), the normal rabbit heart rate varied between 270 and 290, was regular in rhythm and the T waves were upright. Immediately following the injection of curare and the installation of artificial respiration, the heart rate generally dropped to about 100. After a period of 3 to 5 minutes the frequency became more stabilized and returned to an approximate rate of 180 (1, B). Sinus arrhythmia was observed at this stage of the experiment and was interpreted as being due to the influence of artificial respiration on the heart rate; this arrhythmia disappeared completely subsequent to the increase in the frequency of the heart rate.

The records of five experiments are given below as typical examples for our experiments:

Rabbit I: 0.3 c.c. of metrazol produced an immediate slight inversion of the T wave, becoming more pronounced with the appearance of a clonic somatic tremor. An ST elevation occurred during the next 60 seconds, but 30 seconds later this and the T wave had become almost entirely restored to the normal. 0.7 c.c. of metrazol increased the heart rate immediately from 110 to a regular rate of 230, elevated the ST segment, and produced a curious type of electrical alternans of the T wave, indicated by a small biphasic wave alternating with a deeply inverted, cove-shaped wave occurring in every other cycle (1, H). A gradual return to the normal could be observed during the next 65 seconds and the heart rate returned to a frequency of 110; however, the Q wave remained pathologically exaggerated (1, 1). Acute asphyxia produced by cessation of artificial respiration resulted in a further drop of the heart rate to 45 a minute. It showed, furthermore, a 2 to 1 AV block, a high ST segment, and the same type of electrical alternans of the T wave noted (1, J). The changes culminated in a ventricular standstill, the auricles continuing their regular rhythm at a rate of 80 at the conclusion of the experiment (1, K).

Rabbit II: Exactly 6 seconds after the administration of 0.3 c.c. of metrazol, the heart rate increased from 80 to 120 and coincidentally the PR interval became somewhat prolonged (1, C). These changes appeared 6 seconds before the electrocardiographic appearance of a slight somatic tremor and before the dilatation of the pupils. As long as 12 minutes following the injection, an abnormally high ST elevation could still be seen, with a markedly shortened QT interval; the heart rate was 140 per minute and the entire ventricular configuration very suggestive of an intraventricular conduction delay (1, D). Further curare inoculation produced complete bundle branch block with numerous auricular and nodal extrasystoles which had not previously been noted in curare experiments (1, E). 0.4 c.c. of metrazol suddenly interrupted these changes. Forty seconds after the injection a dilatation of the pupils could now be noted and about 2 minutes later there occurred again a marked intraventricular block, now showing a 2:1 relationship (1, F). 0.5 c.c. of metrazol at this time converted the block into more serious grades, varying from 3:1 to 6:1 and continued so until the conclusion of the experiment (1, G).

Rabbit III: Four seconds following administration of 0.5 c.c. of metrazol one noted a deep negative Q wave and an increased rise in the heart rate from 100 to 190, which was followed 8 seconds later by a transient cove-shaped T and a depression of the ST segment; during the next few minutes short spurts of tachycardia occurred associated with extrasystoles arising from numerous foci, auricular and nodal in character. The ST depression soon returned to a normal level after six minutes but the deep negative Q remained throughout the entire experiment. 0.7 c.c. of metrazol at this point produced an immediate rise in heart rate from 150-170, an elevated ST take-off, with a final disappearance of the ST segment. The T wave itself developed a high take-off and in many respects resembled the intraventricular type of QRS complex noted in previous experiments (1, L). Twenty-five seconds later the heart rate dropped from 230 to 95, the T wave remained very tall and there were numerous nodal and auricular systols, varying PR intervals, and occasional P waves not followed by any ventricular complex (1, M). Four minutes after the last injection the ST segment returned to its iso-electric level, the T wave approached the normal, but a deep Q persisted for 20 minutes at the conclusion of the experiment (1, N).

Rabbit IV: Another series of experiments with

deep ether narcosis was used in order to abolish the muscular movements of animals during convulsion. By using an agent which would act on the central nervous system directly, one might expect an electrocardiographic tracing different from that seen in the above experiment in which curare was used as a paralyzing agent. Metrazole was injected during the narcosis and only after the corneal reflexes had been absent for a considerable length of time. Eight seconds following the administration of 0.3 c.c. of metrazol a slight depression of the ST segment was noted which became more definite about 18 seconds later, coincident with the appearance of somatic tremors. Seventy seconds later the depression of the ST segment became more marked and was associated with a sharply inverted T wave, showing the configuration of an electrical alternans (the animal was awake by this time) (1, P). A control tracing five minutes later still showed some evidence of these changes, but these were completely abolished by deep ether narcosis, (1, Q). Again 0.6 c.c. of metrazol was injected intravenously and about twenty-five seconds following the injection, one noted transient ST depression with a quick recovery to the normal curve. Therefore the effect of metrazol on the heart muscle under ether anesthesia was either nullified or became markedly delayed.

Rabbit V: During the experiment employing thujon, 0.1 grain curare produced a progressive slowing of the heart rate but which later returns to the normal rapid rate, when artificial respiration was initiated. Three seconds following injection of 0.4 grain thujon, three successive ventricular extrasystoles appeared, 3 seconds later an inversion of the P wave (lasts only five seconds), and slowing in heart rate, and sixty seconds later a return to the normal control. 0.6 grains thujon injection was followed by a tachycardia 12 seconds later, dropping out of QRS complexes on alternating heart beats, occurred 18 seconds later accompanied by ventricular extrasystoles, and 60 seconds later a return to the normal control. In this latter case, the pupils dilated 40 seconds after injection. Eleven seconds following the injection of 0.6 c.c. metrazol one sees inverted P followed by ventricular extrasystoles, 9 seconds later (pupils dilated) by paroxysmal ventricular tachycardia occurring in short strips, alternating with periods of auricular fibrillation and terminating in this manner.

Comment: The above cited electrocardiographic tracings indicate that severe disturbances of the action current of the heart are demonstrable following the intravenous administration of convulsant doses of metrazol in an experimentally curarized animal. The first noticeable change is a sudden increase in the heart rate which occurs before any evidence of a somatic tremor or any other sign of a convulsive discharge can be noticed. The rhythm remains regular and the increase of heart rate occurs quite abruptly suggestive of a direct central stimulation of the central sympathetic nervous system. Similar sudden elevations of the frequencies of the heart rate were noted in picrotoxin experiment[2] and also by Masserman[6] following direct application of metrazol to the hypothalmus. Coincidentally, or shortly following this sudden discharge of the autonomic nervous system, severe changes in the electrocardiographic tracings can be seen such as ST deviations, T wave changes and persistent depression of the Q waves, suggestive of severe myocardial ischemia. One may assume that these latter changes are also caused by a stimulation of the central sympathetic nervous system, leading to an interruption of the coronary circulation; in the rabbit anesthetized by ether, little or none of these disturbances could be noted, at least as long as the rabbit was kept in deep narcosis. That the ischemia may reach an extremely severe degree was evidenced by the relatively frequent occurence of a comparatively rare disturbance of the electrocardiogram known as electrical alternans, a phenomena only recently described in this country by Hamburger & Katz[9] and later by Kisch.[10] These authors are of the opinion that the electrical alternans is caused by a generalized severe form of ischemia of the heart muscle and not by more local disturbance of the blood flow as generally seen in coronary occlusions. It has been observed in man only on very rare occasions and it has always been indicative of a fatal lesion. In the animals these changes could be seen even before any other alterations occurred, but were reversible in contrast to the cases reported in the literature.

The prolongation of the PR interval, extrasystoles and intraventricular conduction changes

are indicative of an interruption or disturbance of the conduction apparatus. It may be questionable whether these changes were also caused by a central stimulation or were rather secondary to a local ischemia. However, in rabbit No. 2, The PR prolongation occurred before any T wave changes could be seen in the electrocardiographic tracings and it may be surmised that the interference with the conduction apparatus, as evidence by the prolongation of the PR interval, was also induced centrally. Such a prolongation could not be seen in the anesthetized rabbits. Waters[11] reported the case of a patient in whom pressure on the eyeball produced cardiac standstill, whereas ether anesthesia completely abolished this ocular-cardiac reflex.

Thujon was observed to act in a similar but less drastic manner than metrazol.

SUMMARY

Following the injection of a convulsive dose of metrazol in an experimental animal, severe changes of the electrocardiogram can be noted and which precede any convulsive movements or any other evidence of a convulsive discharge. The changes observed are indicative of a stimulation of the central autonomic nervous system and precede a generalized seizure by several seconds. The pathological findings consisted in an increase in the heart rate followed closely by a high degree of ischemia which even led to the appearance of a wave formation known as electrical alternans; T wave changes, ST deviation and persistent Q wave were also noted. An early prolongation of the PR interval was throught to be due to a central stimulation of the parasympathetic nervous system; the later forms of intraventricular block were undoubted evidence of conduction disturbances. The vagal slowing would appear to be related to the period of apnoea following a convulsive seizure and demonstrated in our experiment with curare.

Metrazol, administered in a convulsive dose leads to very profound disturbances of the electrocardiogram, brought about by a central stimulation and overstimulation. This effect can be completely abolished or markedly reduced by ether anesthesia. Although all the changes observed were rather transient in appearance, they were so severe and drastic that they led to alternans disturbances, paroxysmal fatal tachycardia, and even auricular fibrillation.

Thujon was considered to be milder as a convulsant and less drastic in producing EKG disturbances in the curarized rabbit.

Our results would suggest a more cautious use of metrazol, particularly in patients with known diminution of myocardial function.

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DISCUSSION

A. A. Low, M.D., Chicago: As every investigation, the paper presented by Drs. Lieberman and Liebert has both a theoretical and practical aspect. From a practical viewpoint, a study of this kind ought to supply the answer to the vexing question whether or not active convulsive therapy is fraught with danger. It is a credit to the conservative spirit of the essayists that they approached this question with the proper scientific caution. In their final conclusion they state, with becoming reserve, that care is indicated in the use of metrazol, "particularly in patients with known diminution of myocardial function." Undoubtedly, everybody will agree with this conclusion.

We are all aware of the difficulties of interpreting electrocardiographic records. Of course, we know that an abnormal electrocardiogram does not necessarily

mean an abnormal heart. All of us had the distressing experience that a curve was declared "definitely pathological" by the laboratory worker and discounted as insignificant by the clinical consultant. We also know that the electrocardiogram of the same patient may present no notable changes today and somewhat alarming indications tomorrow. Moreover, with special regard to the subject of induced convulsions, the curve may improve in some cases after repeated seizures and may deteriorate in others similarly treated. In reviewing the literature on electrocardiographic studies of induced convulsions, one is struck by the fact that what the one author declares to be a common finding is designated as a rarity by others. Auricular fibrillation is, for instance, commonly mentioned by many investigators as a frequent finding after metrazol convulsions. However, Kline, Fetterman and Williams emphatically state that it "was not observed in a single instance" in their series.

The electrical alternans which Drs. Lieberman and Liebert found as a "relatively frequent occurrence" in their animals is an instance in point. It is known as a notoriously rare complication. Hamburger and Katz claim they encountered the phenomenon once only in close to 10,000 electrocardiograms. However, they add that once their attention was aroused they met with it in three subsequent cases in rather quick succession. They suggest that its occurrence might be less uncommon if the investigators were more "alternans conscious." The fact is that Drs. Lieberman and Liebert had a surprisingly frequent incidence of this rare condition in their animals. Is this due to the vigilance of the essayists who became "alternans conscious?" Or, is it rather due to the fact that rabbits may be more susceptible to damage from convulsive seizures and more likely to produce alarming symptoms? One must also remember that curare was used in the present experiment and that the effect of the drug on the accessory muscles of respiration may have added to the strain of cardiac function. Whatever may be the correct explanation, the difficulty of interpretation must always be kept in mind. The essayists ought to be congratulated on their experimental care, and more particularly, on their cautious procedure in interpreting the results of their investigation.

Dr. B. H. Hilkevitch, Chicago: I am glad to have the opportunity to discuss the valuable contribution of Dr. Lieberman and Dr. Liebert. Dr. Low, made an excellent and constructive discussion, and since I am in complete agreement with most of his remarks, I am going to try to limit my discussion to those aspects of this paper which Dr. Low has not touched. To be more precise, I will discuss the technical aspects of their investigation and the significance of the electrocardiographic changes.

Before evaluating the significance of these changes, it appears to be of importance to evaluate the factors of the experimental "set up" which may have some influence on the electrocardiogram.

It is considered the "curare" has no effect on the cardiovascular system, but we do know that in a number of cases it will cause a drop in the blood pressure, and in larger doses it may even produce considerable excitation of the centers of the autonomic nervous system. With this in mind, one may assume that certain electrocardiographic changes may be the result of direct or indirect effect of "curare." The validity of the latter statement can be found in a recent report of Dr. S. Bellet* and co-workers. They report, in a patient on whom metrazol treatment was instituted after an injection of curare, advanced EKG changes such as: change in rhythm, disturbance in conduction, as well as changes in the ST and T segments. Yet, when metrazol treatment alone was instituted the tracings were normal. Additional evidence of possible influence of "curare" on the EKG, can be found in one of the experiments of the essayists. In this experiment an additional injection of "curare" following a dose of metrazol was given, and immediately severe EKG changes occurred — such as partial block and later bundle branch block — these changes disappeared when metrazol was given again later.

The above remarks were essentially to guard us in the interpretation of the tracings observed by the authors and considered the result of metrazol alone. As you have seen, the abnormalities reported practically embrace the whole scope of electrocardiography namely: changes in rate and rhythm, all forms of conduction disturbances (including even total heart block), nearly all forms of ectopic beats (including short runs of paroxysmal ventricular tachycardia and ventricular fibrillation), as well as abnormalities in P, QRS, ST, and T segments. All these changes, except the QRS, ST and T segements, and paroxysmal ventricular tachycardia and ventricular fibrillation, could easily be caused by excitation of the centers of the parasympathetic and the sympathetic nervous system — namely the hypothalamus — as the result of the direct action of metrazol on these centers. Yet, some local factors acting on the sympathetic and parasympathetic nervous system, as well as changes in the reaction (pH) of the blood may be responsible for these disturbances.

Changes in the ST segment (especially elevation of it) and changes in the T wave are usually, if not always, caused by ischemia of the heart. I think that such changes in the present study are the result of impaired coronary circulation as well as insufficient oxygenation of the blood. I want to remind you that abnormalities in the ST and T segments occurred in practically all experiments following a considerable increase in the heart rate after metrazol injections.

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*Bellet, S.; Kershbaum, A.; Furst, W.; Am. J. Med. Sc.; 201: 167: '41.

In these cases the heart rate is often doubled. Now, it is known a marked tachycardia even in a normal heart may produce changes in these segments; the reason being that in tachycardia, the diastolic phase is shortened and thus interferes with the filling of the left ventricle and also, to some extent, with the filling of the coronary arteries. In addition, the artificial 'set up' of the experiments had other factors disturbing the normal cardiovascular dynamics. Thus, the complete paralysis of the skeletal musculature and the diaphragm interferes with the filling of the right heart, also the paralysis of the splanchnic nerves is an additional factor in impairing the circulation. All this, will produce a disturbance in coronary circulation with the resulting abnormalities in the tracings. Even the appearance of the extrasystole from different foci, the paroxysmal ventricular tachycardia, and ventricular fibrillation are probably due to the same factors.

I want to conclude my sketchy remarks by saying that I am in complete agreement with the authors, that the observed changes were transitory. They are observed on experimental animals under artificial conditions, and naturally these results cannot be totally carried over to human beings; but they do warrant the authors cautioning doctors to be more careful in selecting patients for metrazol treatment. My personal experience, as well as the experience of other investigators, is that only advanced myocardial changes are definite contraindications for metrazol treatment.

Dr. Alan Lieberman, Elgin (closing): As to the effect of curare, it has recently been reiterated in the literature that curare is known only to effect voluntary muscles and has no effect whatsoever upon involuntary c smooth muscle, and therefore, has not been known at any time to have any effect on the heart. In our experience we attempted through artificial respiration to restore the respiratory rate to a condition which is relatively normal for the rabbit, and our best experimental control is the normal electrocradiographic tracing of the animal, which we have been able to indicate in every instance prior to and after every experiment.

As regards the ST and T wave changes which may be construed as being due to the direct action of metrazol upon the heart, this possibility is equally as logical as the other possibility that the effect is centrally induced, producing a vaso-constriction of the coronary vessels. We are all familiar with the frequent occurrence in patients receiving metrazol of a feeling of overwhelming fear and very sharp precordial pain.

I am very grateful to Dr. Low and Dr. Hilkevitch for their comments and suggestions.

BLOOD AND BLOOD SUBSTITUTES IN THE TREATMENT AND PREVENTION OF SHOCK: WITH PARTICULAR REFERENCE TO THEIR USES IN WARFARE

By Alfred Blalock, M.D., and M. F. Mason, Ph.D., Nashville

Condensed from the Annals of Surgery

In the treatment of traumatic shock the primary objective is the restoration of a blood volume reduced by hemorrhage, loss of plasma locally at the site of the injury, or generally as a result of increased capillary permeability. Infusion of crystalloidal solutions only transiently increases the blood volume and may, eventually, still further reduce it. Only whole blood or plasma may safely, effectively, and permanently restore the volume of the circulation. Plasma is preferable because a unit volume supplies more osmotically active protein than does whole blood. The latter is essential only in the presence of anemia.

Valuable time is saved in emergencies by having preserved whole blood from universal donors and plasma available at a moment's notice. The improvement in the treatment of injuries in civil practice is an index of this increased availability of blood and plasma in blood banks.

The limitations of whole blood are accentuated under conditions of warfare. Plasma is better adapted to cope with this situation. This is particularly true of dried plasma which may be preserved indefinitely at uncontrolled temperatures. The length of time that sterile liquid plasma may be safely kept unrefrigerated is not yet established. It must also be remembered that a liter of liquid plasma when transported carries with it 950 Gm. of unnecessary water in addition to the 80 Gm. of essential protein.

In civil life dried plasma can be made available in communities remote from blood banks. Dried plasma has certain disadvantages both in civil and war surgery. Its preparation is expensive; sterile distilled water must be available; and time is required for the dried powder to go into solution. This is usually only a few minutes, however. Liquid plasma may thus be administered with less delay and less equipment. Nevertheless the dried form will remain superior to liquid plasma until the problem of permanent preservation of the latter is solved.

Despite hemolysis and the gradual diffusion of electrolytes from the erythrocytes, preserved whole blood not over 2 weeks old is usually as effective as fresh blood in the treatment of shock. After the blood has aged to the point of being too old for use as whole blood it may be converted into plasma.

Clinical-Pathological Conferences

J. J. Moore, M.D., Department Editor.

PRESENTATION OF CASES

By
I. Davidsohn, M.D., Pathologist
Mount Sinai Hospital
Chicago

HEMOCHROMATOSIS, THYMOMA, SEVERE ANEMIA AND ENDOCARDITIS IN A WOMAN

A 58 year old white woman was admitted for the first time on 10-27-39 with the complaints of pain in back, fever for 6 weeks, and headache. Past History: Patient was seen by her physician one month prior to admission with essentially similar complaints. At that time the blood count revealed 3,330,000 red blood cells. Fluoroscopic examination revealed a mass in the mediastinum. When she was seen again on the day of admission her red count dropped to 1,510,000.

Physical examination: Blood pressure 164/74, temperature 99.8, pulse 108, respiration 24. Findings: Pale visible mucous membranes and atrophy of mucosa on left side of tongue. Heart was slightly enlarged to the left with a soft systolic murmur at apex.

Laboratory reports: Blood chemistry: Sugar 111 mg. per 100 cc. of blood, urea nitrogen 18.5 mg., non-protein-nitrogen 31.4 mg., uric acid 3.98, chlorides 580 mg., calcium 11.2 mg., icterus index 8.8. The Kolmer complement fixation and the Kahn precipitation tests for syphilis were negative. Sedimentation rate 155 mm./1 hr.; Blood count: red blood cells 1,650,000; white blood cells 7,200; reticulocytes 0; hemoglobin 5.2 Gm. (31.2 per cent), color index 1.0. Differential count: segmented leucocytes 73, lymphocytes 36, monocytes 1. There was slight aniso- and poikilocytosis. In the further course the red count showed only moderate changes, the highest being 2,260,000, the same holds for the hemoglobin, the highest being 39 per cent. There was no noticeable increase in the reticulocytes, but the white cells were consistently low dropping to 4,500. Sternal puncture showed a depression or hypoplasia of the erythropoietic elements of the marrow. Urinalysis: no abnormalities. Gastric analysis, alcohol test meal: free HC1 40, total acidity 60. Electro-cardiogram, normal. X-Ray examination of the chest revealed: "A pathological mass in the right upper anterior mediastinum about the size of an egg. The outline of this mass is very regular. We are under the impression that we are dealing with a true tumor formation and not with an aortic aneurysm. For the differential diagnosis, we have to think more of a benign than of a malignant growth."

Clinical course and treatment: The temperature was elevated in afternoons and down in mornings varying between 98.6° and 100.2°. Patient was given reticulogen and 3 blood transfusions, but did not improve. The blood picture remained essentially the same. Patient was discharged on 11-17-39. The patient was in the hospital four more times, for periods varying from three days to seven weeks. The complaints and findings were essentially the same. The anemia persisted with brief rises immediately following the transfusions, of which upward of sixty were given by the end of 1940. Only on one occasion (in August 1940) was the blood sugar above normal (157 mg.). The mediastinal mass remained unchanged. Several blood cultures showed no growth. During the intervals she was also admitted to other hospitals with essentially the same findings. Once a sternal biopsy was removed. The results were similar to those found in the sternal punctures in the Mount Sinai Hospital.

The last admission was on 2-16-41. Condition

of the patient was about the same except for the appearance of a skin rash over most of the body. Temperature was elevated at first then normal for one week, then went back to the old course of elevation in afternoons up to 103.8 F. and down in the morning until patient was discharged. Patient was still getting repeated transfusions. During this stay the red counts varied from 1,800,000 to 3,300,000, the hemoglobin varied from 32 to 55 per cent, the color index from 0.8 to 1.2, the white counts were higher than on previous occasions varying from 7,400 to 14,800. The differential counts showed increases of segmented leucocytes up to 88 per cent. The reticulocytes were higher at first, reaching a peak of 1.8 per cent, but toward the end of the stay another drop took place and reticulocytes could not be found. Patient was discharged on 3-25-41.

The patient remained home until her death on May 5, 1941. The body was brought to the hospital for autopsy.

DR. L. EDIDIN.

This very interesting case presented a difficult diagnostic problem. The cardinal points in the history were anemia, fever, mediastinal tumor and cardiac findings. The anemia apparently developed under our very eyes. On the first examination in the office the hemoblobin was 65 per cent and the red blood count 3,330,000; a month later, the hemoglobin was 28 per cent and the red blood count 1,500,000. Numerous blood smears showed nothing characteristic, except a reduction in the red blood cells and a corresponding reduction in the hemoglobin, and absence of reticulocytes, with the exception of a brief rise for a period of two weeks on her last admission to the hospital. The anemia did not respond to any form of treatment, such as iron, liver, or transfusions. Transfusions of which she received about 75 over a period of 16 months served only as replacement therapy without any influence on the anemia, and had to be repeated about every ten days to keep the patient alive. Except for a few periods of normal temperature lasting from one to two weeks, fever was present throughout the course of the disease. The temperature ranged from 99 to 102 during her first stay in the hospital and from 99 to 104 during the last stay, rising even higher in the final stages of her illness.

The mediastinal shadow was regular in outline and about the size and shape of an egg. In the anterio-posterior view, it seemed to spring out of the aortic arch. In the oblique view and under the fluoroscope, it seemed to lie to the right and at the bifurcation of the trachea. Its size and appearance remained the same on all films throughout a period of 17 months.

The cardiac findings consisted of a soft, blowing systolic murmur at the apex, increasing somewhat in intensity as the illness progressed.

Diagnostic possibilities: (1) Aplastic anemia was easily ruled out because the granulocytes were, if anything, increased, and the bone marrow showed only a hypoplasia of the erythropoietic function. (2) Infectious endocarditis was eliminated by the absence of any of the cardinal findings, such as, petechiae, clubbing of the fingers, and palpable spleen. The anemia was too severe for an infectious endocarditis. The murmur could have been caused by the anemia. (3) Aneurism was considered, but the pulsation was not marked enough, the Wassermann was negative, and the fever and the anemia were too severe. The incidence of aneurism in women is very infrequent. (4) a metastatic tumor of the mediastinum was ruled out by the lack of growth of the mass during the period of observation of 17 months, by the failure to locate a primary source, and absence of other metastases.

The most probable diagnosis considered was Lymphoma (Hodgkins, Lymphoblastoma, etc.) with Pel-Ebstein syndrome and anemia due to suppression or involvement of the bone marrow.

DR. I. DAVIDSOHN.

The autopsy was performed four hours after death. The body was in a good state of nutrition. The skin was somewhat darker than normal over the arms and neck, with small areas of desquamation, but of normal color elsewhere, with slight pitting edema of the legs. Transudates, 1300 cc. in the abdominal cavity, and 200 cc. in the right and 100 cc. in the left pleural cavities, were present. Fibrinous deposits and occasional petechial hemorrhages were found on the inner surface of the pericardial sac and over the auricles of the heart with a normal amount of pericardial fluid. The heart weighed 370 grams. A few small firm vegetations were attached firmly to the chordae tendinaeae of the

anterior leaflet of the mitral valve. Their surface and the surface of the slightly thickened leaflets were smooth and glistening. The other valves appeared normal. The myocardium was soft and dark brown. The coronary arteries appeared normal. The thyroid weighed 22.5 Gm. It was dark brown and contained nodules up to 8 mm. in size with a transpatent, moist and homogeneous sectioned surface. In the upper right mediastinum, close to the right border of of the trachea and of the aorta, but not attached to either was a firm, globular, encapsulated mass, 45 x 45 x 40 mm. in size, with a dark brown lobulated sectioned surface and enclosing smooth homogeneous yellow nodes up to 10 mm. in size. The left lung weighed 310 Gm., the right 500 Gm. Both were emphysematous, with occasional bullae, with purplish areas of atelectasis in the lower lobes, and with patches of bronchopneumonic consolidation in the right middle lobe. The spleen weighed 400 Gm. Old firm adhesions to the diaphragm and to the splenic flexure of the colon, a recent fibrinous perisplenitis and two anemic infarcts near the upper pole, the larger measuring 3 x 2 x 1 cm., were present. The consistency was firm, the sectioned surface smooth, dark rusty brown, with indistinct follicles. The artery and veins were without abnormalities. The liver was somewhat smaller than normal (1370 Gm.). The color was reddish brown, with flat nodules on the outer and sectioned surfaces with an obliterated acinar structure, the consistency firm. The pancreas, of about normal size, had a deep reddish brown color which was emphasized by the light yellow color of the abundant surrounding and infiltrating fat. The mucosa of the stomach and of the small intestines was thin, deep brown and covered with a thick mucus. The lymph nodes were small, rather firm and dark brown. The other organs showed no remarkable changes. In a blood culture taken at the autopsy B. coli was found.

Microscopic examination:

Liver: Massive deposits of a brown granular pigment are present within the epithelial cells of the acini, within the Kupffer cells (Fig. 1), in the epithelial cells of the bile ducts and in the interacinar connective tissue. The latter is greatly increased in amount, producing a distortion of the liver architecture and enclosing proliferating and branching bile ducts (Fig. 2). Some fat infiltration is present. Special stains revealed iron in the pigment. The picture is that of an extreme hemosiderosis and a moderately advanced cirrhosis. Pancreas: Here, too, massive accumulations or iron containing pigment are present, mostly in the greatly increased interstitial connective tissue with an atrophy of the parenchyma (Fig. 3). Similar deposits of pigment were found in the spleen, in the lymph

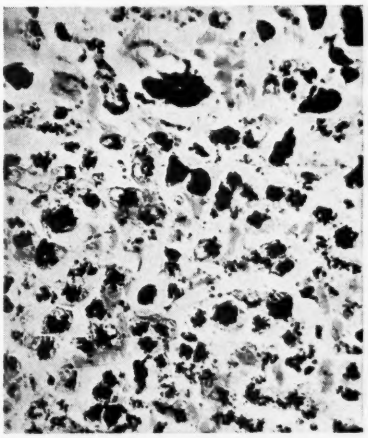

Fig. 1. High power magnification. Stain for hemosiderin. Rich deposits of iron containing pigment in the epithelial cells and in Kupffer star cells. Note the Kupffer cell at top filled to bursting.

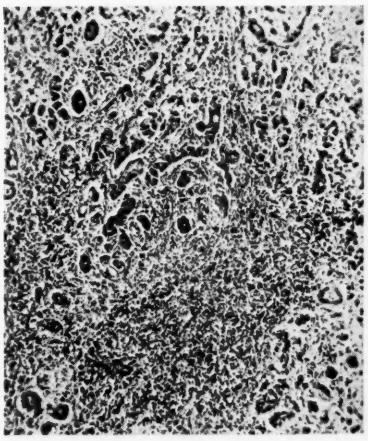

Fig. 2. Liver. Increase of interlobular connective tissue and distortion of the normal structure by invasion of the lobules. Proliferation of bile ducts. Abundant deposits of pigment.

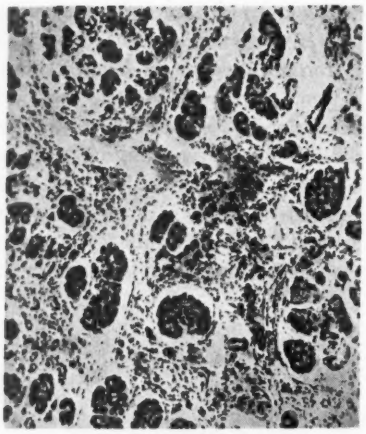

Fig. 3. Pancreas. Atrophy of parenchyma with increase of interstitial connective tissue. Deposits of pigment.

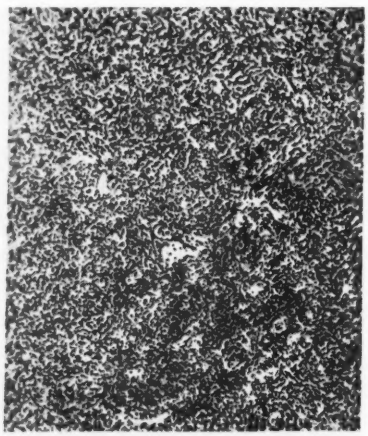

Fig. 4. Thymoma. Low power magnification showing the two types of cells, the polygonal and spindle shaped cells surrounding the large pale cells with abundant cytoplasm.

nodes, in the zona glomerulosa of the adrenals, in the thyroid, in the muscle fibers of the heart, in the bone marrow, in the mucosa and to a lesser degree in the other layers of the stomach and of the small intestines, in the mediastinal tumor and in the cells of the anterior lobe of the hypophysis. In the kidneys deposits of iron pigment are localized in the epithelial cells of the distal portions of the convoluted tubules and nowhere else. The skin contains no iron pigment and normal amount of melanin. In the pulmonary alveoli a small number of cells loaded with blood pigment are found, but no evidence of hemosiderosis. The brain is free if hemosiderin.

Mediastinal tumor: A network of polygonal and spindle shaped cells with round and oval shaped nuclei and a rather indistinct cytoplasm encloses small groups of large cells with vesicular nuclei and abundant fat rich cytoplasm (Fig. 4). The blood vessels are numerous and many bundles of nervous fibers are present. Occasional round structures are seen resembling rudimentary Hassal corpuscles. The histologic picture is that of a so-called lymphoepithelioma of the thymus.

Heart: In addition to the rich deposits of iron pigment within the muscle fibers, characteristically located at the poles of the nuclei and spreading from there in all directions, sections from the mitral valves show severe acute and subacute inflammatory changes limited to the interstitial portions of the leaflets with massive infiltrations with mononuclear histiocytic cells, with some leucocytes and with occasional foci of necrosis. The intimal surface is intact and free of thrombotic deposits; newly formed blood vessels are abundant. In sections stained with Gram stain bacteria could not be found. The surface of the epicardium shows marked hyperemia and exudation of fibrin on the surface. The changes in the mitral valve are indicative of an early endocarditis.

Sections from the stomach show a diffuse edema and infiltration of all the layers with lymphocytes and plasma cells. Similar changes are also present in the duodenum and jejunum.

Bone Marrow: In addition to the already mentioned deposits of iron pigment there is a definite decrease of the precursors of red blood cells, a hypoplasia of the erythroblastic portion of the marrow, the myeloid and megakaryocytic elements being fairly normal.

Anatomic diagnosis: Hemochromatosis of liver, pancreas, spleen, lymph nodes, thyroid, heart, stomach, small intestines, adrenals, hypophysis, kidneys and of the mediastinal tumor, pigmentary cirrhosis of liver, fibrosis and atrophy of pancreas, thymoma (lymphoepithelioma) of mediastinum, acute vegetative endocarditis of mitral valve, acute fibrinous pericarditis, chronic

gastritis and enteritis, multiple anemic infarcts of spleen and an acute fibrinous perisplenitis with old adhesions, bronchopneumonia (terminal) of right middle lobe, bilateral hydrothorax and ascites, severe anemia and B. coli septicemia.

Discussion No. 2: The disease entity found in this patient was first described by Trousseau in 1865. Hanot and Chauffard introduced the name bronze diabetes in 1886 and von Recklinghausen called it hemochromatosis in 1889. The recent exhaustive review by Sheldon lists 311 verified cases up to 1934, only twenty-five of them in women. Of the triad of bronzing of the skin, of diabetes, and of extensive deposits of iron containing pigment, only the last mentioned is always present. The pigmentation of skin though present in the majority of cases (about 84 per cent), is absent in about 16 per cent. In some the skin may be dark, but no iron pigment is found, as was in our patient. In some instances, the melanin of the skin is increased in amount.

Diabetes is present in about 80 per cent, but may be absent entirely, as was in our case, because not too much significance can be attached to the finding of an elevated blood sugar (157 mg.) on one occasion, with many tests showing normal sugar levels and never even a trace of sugar in the urine. It may be that a sugar tolerance test might have revealed an abnormal curve in our patient. It seems that the appearance of diabetes is only a matter of time. The longer the duration of the disease the larger is the incidence of clinical diabetes.

The cirrhosis of the liver is regularly present. It is considered the result of the pigmentary deposits. The liver is usually large, but occasionally not enlarged as in our case.

There are other diseases with deposits of iron — holding pigment, for instance hemolytic anemias of all kinds, or pernicious anemia. In these the pigment is located in the cells of the reticulo-endothelial system and its deposition does not lead to fibrosis and cirrhosis. In hemochromatosis the pigment is deposited in the secreting epithelial cells of the parenchymatous organs as well as in the endothelial cells and the reticulum of the reticuloendothelial system. It is claimed, though not without objections, that the former location is the earlier and that the reticulo-endothelium gets the overflow. The amounts of deposited iron may be enormous. While the normal amount of iron in dried liver tissue varies from 0.05 to 0.1 per cent, the average in hemochromatotic livers is 3.65 per cent and as much as 7.6 per cent was found. The total iron in some analyzed livers amounted to over 21 grams while the iron accumulated in the entire body was estimated in some instances to reach from 40 to 50 grams.

Where does all the iron come from? It was believed for a long time that it comes from the blood. It is estimated that about 150 mg. of iron per day is needed for the production of blood. Most of it comes from the breakdown of red blood cells. The average iron content of a normal balanced diet amounts to from 10 to 20 mg. per day. It was found that 6 mg. of iron per day is the minimum needed in the food. If the diet contains less than the minimum of 6 mg. of iron blood regeneration suffers. It is assumed that the 6 mg. that is needed in the diet is the quantity of iron lost in the course of metabolism from the 150 mg. that are supplied by the destroyed red cells. It was suggested that the abnormality of metabolism in hemochromatosis is due to the retention of all or of a part of the 6 mg. of blood iron which has to be supplied by the diet. However, various reasons speak against this concept. Some of them were mentioned previously. It seems more likely that the deposition of iron has something to do with the secretory function of cells in some or most of the parenchymatous organs. That would explain the location of the iron in the epithelial cells of many organs. Sheldon suggested that the deposits come from the iron used in internal cellular respiration and that it is a part of the cellular pigment cyctochrome which takes part in cellular respiration. According to this hypothesis the abnormality consists in the inability of the cell to return the iron of the cytochrome pigment. Retention of amounts as small as 1.25 to 2.5 mg. per day would suffice to bring about the accumulation of the large amounts of iron in the course of years. This hypothesis would also explain the deposits of hemofuscin, a pigment related to melanin, and of copper, both of which are increased in hemochromatosis and both of which are contained in cytochrome.

The blood shows as a rule no quantitative or qualitative changes. There is no anemia. The anemia in our patient may have been due to the chronic gastritis and enteritis; the endocarditis can not explain it because it had all the earmarks of recent origin and could have hardly been older than a few weeks. The recorded instances of thymoma have not been associated with anemia unless they were malignant and then the anemia was of the type in advanced malignancy. In our patient the tumor, though histologically malignant, remained stationary during the entire period of observation of seventeen months and at autopsy showed no signs of invasion or of metasis.

It is assumed that hemochromatosis is a congenital disease. This is supported by a considerable number of reported instances of familial occurrence. The deposits of iron accumulate slowly and clinical manifestations begin to appear when the amount of iron reaches the level of from 40 to 50 grams. According to some estimates that would take approximately fifty years, which is the average age when the disease was observed in most cases. In younger persons the finding of hemachromatosis was usually accidental at necropsies. The unusual features of our case are the occurrence in a woman, the absence of demonstrable iron in the skin and of diabetes, the only two findings which make a diagnosis possible. To make the picture still more complicated a severe anemia, an unusual finding in hemochromatosis, a mediastinal tumor and an endocarditis were present.

DOCTORS AND ARMY MEDICINE

Army medicine in the United States began with the Revolutionary period when Dr. Joseph Warren, a major general of militia, and several other medical men fought in the line during the Battle of Bunker Hill. Major C. R. Darnall, Medical Corps, (retired as brigadier general on December 31, 1931) originated and devised a method of purifying water by means of chlorine. In 1910 he added to his discovery by developing a mechanical liquid chlorine water purifier which is now used throughout the world.

Major Walter Reed, Medical Corps, assisted by members of his medical board, made the outstanding investigation about yellow fever, proving this particular disease to be transmitted by the mosquito. During the Spanish-American War of 1898, the "Reed-Vaughn-Shakespeare Typhoid Board" composed of medical officers, was appointed to make a study of the disease in the Camps. The report of these Army officers on typhoid shed much of our present light on the disease.

In 1908 the Army sent Major F. F. Russell, Medical Corps, to Europe to study the epidemiology of typhoid fever in foreign armies. Surgeon General George M. Sternberg, a pioneer bacteriologist, founded the Army Medical School and during his administration, laboratories were established in all station hospitals. He made many researches on pneumonia, malaria, yellow fever and serum therapy. An Army doctor, Colonel Bailey K. Ashford, at work in Puerto Rico in 1910 discovered that the disease "Debilitating anemia" was due to hookworms and thereby laid the foundation for the eradication of the parasitic infestation.

Colonel E. B. Vedder, Medical Corps, (retired as colonel on October 31, 1933) furthered the accomplishments of the Army Medical Department by his fortunate and wise investigation of diets of all the troops in the tropics and their relation to this deficiency disease, resulting in the complete elimination of beriberi in the Army.

Major Raymond A. Kelser, an Army Veterinary Officer, developed a very successful vaccine against rinderpest, a highly destructive disease of cattle. This took place in the Philippine Islands about 1928 and was instrumental in the saving of many thousands of water buffalo, which are the beasts of burden in the Orient.

Again in Puerto Rico, Major John Van R. Hoff, Medical Corps, and the chief surgeon of the Puerto Rican command, put on an active campaign to free the island from the scourge of smallpox, by reinstituting controlled vaccination of thousands of its inhabitants.

Medical officers of the World War made numerous advances in surgery and orthopedics. The use of antiseptics in the treatment of wounds led to the use of Carrell-Dakin solution. In the Civil War 31,978, a ratio of 10.48 per 1000 died from wounds in hospitals, and in the World War 13,691, a ratio of 4.5 per 1000.

The career of the medical officer in the United States Army may not offer so great a financial reward as that of the successful civilian doctor.—*The New York Physician.*

(Ed. note.—We are indebted for this information to the publishers of MILITARY MEDICAL MANUAL, the fourth edition, which has just been released by the Military Service Publishing Company of Harrisburg, Pa.)

In tuberculosis, I suggest that we are in this and in other countries, under-armed for the defense of the healthy as well as for the defense of the sick. J. B. McDougall, M.D., Bull. de l'Union, Inter, Contre Tuber., July, 1939.

News of the State

PERSONALS · COMING EVENTS · MARRIAGES · DEATHS

The first meeting of the Clinical Section of the Chicago Heart Association will be held on Wednesday, November 19, at Billings Hospital, P-117, from 10:00 A. M. to 12 Noon.

The Bond County Medical Society honored Dr. J. D. Chittum of Sorento at a banquet in Greenville on September 30 when he was presented with the 50 year pin, the emblem of the Illinois State Medical Society and at the same time was presented a certificate of life membership in the Society in honor of his services. The presentation speech was made by James S. Templeton. Dr. R. F. Herndon gave the scientific paper of the evening talking on "Coronary Artery Disease."

WHAT GOVERNOR GREEN SAYS OF HEALTH DEPARTMENT

In announcing October 2 that he would retain Dr. Roland R. Cross as Illinois Director of Public Health, Governor Dwight H. Green said, "I have considered the direction of the Department of Public Health as such a vital function in government, that almost from the day of my election last November I have given constant consideration to the selection of the man under whose direction the Department should be. I have consulted with many medical and health authorities, and the recommendation of Dr. Cross has been almost unanimous. . . . Since he has been in charge of the Department, marked advances have been made in disease prevention and general health conditions throughout the State. Dr. Cross' campaign of public education in itself is a great recommendation, for it is by teaching people the way to health that they can be safeguarded best."

DR. PETTITT BECOMES ASSISTANT STATE HEALTH DIRECTOR

On October 14, 1941, Governor Dwight H. Green appointed Dr. Herbert L. Pettitt of Morrison, Illinois, to the position of Assistant Director of the State Department of Public Health. Well known in medical and public health circles, Dr. Pettitt is a graduate of the College of Medicine of the University of Illinois, a Fellow of the A.M.A., and an active member of the Illinois State Medical Society. Besides about thirty years of experience in private medical practice, Dr. Pettitt has to his credit a year of service in the Army Medical Corps during the last World War, has been a member of the Board of Directors of the Illinois Tuberculosis Association for the last eleven years, and served as President of the Whiteside County Tuberculosis Association from 1930 to 1940.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

The Department's annual Illinois Conference on Public Health will open at 9:00 a.m. December 4 in the Auditorium of the Centennial Bldg., with Dr. Alice V. Keliher of New York University giving a demonstration of the utilization of motion pictures in group health education. At the afternoon session the recent impressive experiments at Johns Hopkins on the prevention of deafness in school children will be described by Dr. L. M. Polvogt. Dr. Anton Julius Carlson of the University of Chicago will talk on the subject, "Sub-clinical Disease; Are Our Present Conceptions of Health and Disease Adequate?" at the banquet session at 6:30 p.m. in the Abraham Lincoln Hotel. Among the highlights of the second day's program will be a discussion of

nutrition by Dr. Clifford J. Barborka and a talk on water supplies and dental caries by Dr. H. T. Dean of the U.S.P.H.S. The full preliminary program of the Conference will be released in an early issue of the ILLINOIS HEALTH MESSENGER.

I.P.H.A. WILL MEET DURING ILLINOIS CONFERENCE ON PUBLIC HEALTH

The regular annual business meeting of the general membership of the Illinois Public Health Association will take place at 12:15 p.m. December 4, with a luncheon at the Leland Hotel, Springfield.

7th DISTRICT POST GRADUATE CONFERENCE

November 18

Benwood Hotel, Effingham, Illinois

E. S. Frazier, M. D. — President Effingham County Medical Society, Presiding

3:00-3:30 P. M. — "Pneumonia" — Wayne W. Fox, M. D., Evanston, Clinical Assistant in Medicine, Northwestern University Medical School.

3:30-4:00 P. M.—"Otitis Media, Mastoiditis and Their Complications" — George H. Woodruff, M. D., Joliet.

4:00-4:30 P.M.—"Surgical Complications of Biliary Tract Surgery" — Charles H. Phifer, Chicago, President Illinois State Medical Society, Professor of Surgery, University of Illinois College of Medicine.

4:30-5:30 P. M.—Round Tables in Medicine, Eye, Ear, Nose & Throat, and Surgery.

5:30-6:30 P. M.—Social Hour

6:30-7:30 P. M.—Dinner

7:30-8:15 P. M.—"Blood Dyscrasias, Diagnosis and Therapy" — Aaron Arkin, M. D., Chicago, Clinical Professor of Medicine, Rush Medical College.

Ogle County Medical Society held a Fall Meeting Oct. 16, 1941 at the Spoor Hotel, Oregon, Illinois. Election of officers: Dr. DuMont, Mt. Morris, President; Dr. Dearborn, Byron, Vice President; Dr. Bogue, Rochelle, Secretary and Treasurer; Dr. W. E. Kittler, Rochelle, Delegate (Two Years); Dr. Bogue, Rochelle, Alternate Delegate; Dr. Warmolts, Oregon, Censor (Two Years); Dr. Kloster, Oregon, Censor (Three Years).

Dr. Kittler read a memoriam to the late Dr. Kennedy.

Dr. Dearborn of Byron was voted a membership.

Mr. Clinton, County Superintendent of Welfare, spoke to the meeting and explained the new laws on Medical Assistance to pension patients.

Dr. Leonard Weber, Asst. Prof. of Dermatology, University of Illinois gave a talk on "Common Diseases of the Skin." This was illustrated with slides and very instructive bringing out many questions of interest.

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY EYE, EAR, NOSE AND THROAT SPECIALISTS ELECT OFFICERS

Dr. James A. Babbitt, emeritus professor of clinical otolaryngology (diseases of the ear, nose and throat) at the University of Pennsylvania School of Medicine, and associate professor of otolaryngology in the university's graduate school of medicine, Philadelphia, was named president-elect of the American Academy of Ophthalmology and Otolaryngology at its annual meeting in Chicago, Wednesday night, October 22. Dr. Babbitt will take office January 1, 1943. The present president-elect is Dr. Ralph I. Lloyd, Brooklyn, who will assume office on January 1, 1942.

Vice presidents elected are Drs. Walter Theobald, Chicago; Forrest J. Pinkerton, Honolulu, Hawaii, and Francis E. Le Jeune, New Orleans. Dr. Cecord H. Large, Cleveland, was reelected comptroller and Dr. William P. Wherry, Omaha, Nebraska, executive secretary-treasurer.

Awards for the best scientific exhibits were also announced Wednesday night. The awards were made in three classifications: For excellence of presentation, Dr. Phillips Thygeson, Presbyterian Hospital of New York received the award in ophthalmology for his exhibit on infections of the eye and treatment with the sulfonamide drugs, and Dr. Maurice F. Snitman of the University of Illinois, Chicago, the award in otolaryngology for his exhibit on anatomy of the ear, nose and throat.

In the section on ear, nose and throat the award went to Dr. Paul Holinger of the Uni-

versity of Illinois College of Medicine, Chicago, his work on a new method of photographing of the lower part of the respiratory tract, the tracheobronchial tree and the esophagus.

The third group of exhibits were those judged for their teaching value. Awards were given to Dr. Peter Kronfeld of the Illinois Eye and Ear Infirmary, Chicago, for studies of tension within the eye and to Dr. Henry B. Orton, Newark, N. J., for an exhibit on cancer of the larynx.

Dr. Harry S. Gradle of Chicago was awarded a medal commemorating twenty-one years of continuous service to the Academy.

COMING MEETINGS

November 11 — Kankakee County Medical Society, Kankakee, 8:00 P. M. Italo F. Volini — "Sulfanilamide Group of Drugs."

November 11 — Bureau County Medical Society, St. Margaret's Hospital, Spring Valley —

November 12 — Will-Grundy County Medical Society — Louis Joliet Hotel Joliet, 12:00 noon — James H. Hutton — "Recent Progress in Endocrinology."

November 12 — McDonough County Medical Society — Macomb — evening — F. G. Norbury — "The Nervous Patient in General Practice."

November 13 — Tri-County Medical Society — Galesburg Club, Galesburg — 4:00 P. M. —
Howard L. Alt — "The Common Blood Diseases Seen in General Practice."
Francis L. Lederer — "The Clinical Significance of Hoarseness."
Ralph A. Reis — "Office Gynecology."
Geza deTakats — "Peripheral Vascular Disease."

November 18 — 7th Councilor District Post Graduate Conference — 3:00, Benwood Hotel, Effingham.

November 19 — Will-Grundy County Medical Society, Louis Joliet Hotel, Joliet, 12:00 noon — Archibald Hoyne — "Scarlet Fever."

November 26 — Will-Grundy County Medical Society — 12:00 noon, Louis Joliet Hotel, Joliet — S. M. Feinberg "Hay Fever Management: Evaluation of Various Methods."

November 27 — 2nd Councilor District Post Graduate Conference — Kaskaskia Hotel, LaSalle — 12:00 noon — luncheon.

December 9 — Bureau County Medical Society — Perry Memorial Hospital, Princeton — Dinner at 6:30 P. M.

December 9 — Effingham County Medical Society — Benwood Hotel, Effingham, 6:30 — George L. Apfelbach, "Methods Employed in Examining for Lower Back Pain and Manipulative Treatment."

December 10 — Will-Grundy County Medical Society —Louis Joliet Hotel, Joliet — 12:00 noon —

MARRIAGES

GEORGE ROGERSON WOLTMANN, Chicago, to Miss Betty Thomas of Urbana, August 2.

PHILLIP HENRY BEST, Paris, Ill., to Miss Ruth Moritz of Effingham, June 28.

DEATHS

GILBERT HAVEN AYLING, Kankakee, Ill.; Northwestern University Medical School, Chicago, 1909; served during the World War; on the staff of St. Mary's Hospital; aged 59; died, August 29, of coronary occlusion.

JOHN C. BERRY, Chicago; Chicago Medical College, 1890; aged 73; died, September 21, at the Englewood Hospital of mesenteric thrombosis.

ARTHUR HENRY BRUMBACK, Chicago; College of Physicians and Surgeons of Chicago, 1884; member of the Illinois State Medical Society; at one time on the staff of the Westside Hospital; aged 79; died, September 10, in the Garfield Park Hospital of acute dilatation of the heart and cirrhosis of the liver.

WILLIAM ERNEST CARY, Chicago; Rush Medical College, Chicago, 1921; assistant clinical professor of medicine at the University of Chicago, The School of Medicine; attending physician on the staff of the Chicago Memorial Hospital; aged 52; died, August 29.

GEORGE HOWARD FULLER, Tuscola, Ill.; University of Wooster Medical Department, Cleveland, 1896; for many years president of the school board; aged 73; died, September 1, in Decatur.

HUBERT WILLIAM HANCOCK, Chicago; St. Louis College of Physicians and Surgeons, 1918; aged 56; died, July 7, of coronary thrombosis.

RALPH JOSEPH KARRASCH, Chicago; Loyola University School of Medicine, Chicago, 1936; member of the Illinois State Medical Society; aged 32; died, July 30, at Martha Washington Hospital of bilateral apical pneumonia with streptococcic infection.

ARVID ERNEST KOHLER, Moline, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1898; served during the World War; aged 67; died, September 6, in the Moline Public Hospital of a mediastinal tumor.

JEREMIAH EMMET LEAHY, Chicago; Jefferson Medical College of Philadelphia, 1896; veteran of the Spanish-American War; clinical assistant in surgery at Northwestern University Medical School from 1910 to 1913; aged 70; died, September 13, of coronary thrombosis and arteriosclerosis.

FRANK CUTLER LINDEN, Chicago; College of Physicians and Surgeons of Chicago, 1889; aged 80; died,

August 30, at Neosho, Wis., of injuries received in an automobile accident.

WILLIAM FREDERIC NUTT, Chicago; Chicago Physio-Medical College, 1898; aged 87; died in September of hemorrhage of the urinary bladder.

MAURICE J. RUBEL, Chicago; Johns Hopkins University School of Medicine, Baltimore, 1901; aged 66; died, September 17, of carcinoma of the liver.

CHARLES EMERSON SOULE, Beardstown, Ill.; College of Physicians and Surgeons of Chicago, 1889; president of the Cass County Medical Society; secretary of the school board; ages 78; died, August 14.

JULIUS WIRTH, Highland, Ill.; New Orleans School of Medicine, 1870; aged 94; died, August 15.

MARCUS GERSH WOLK, Chicago; University of Tomsk Faculty of Medicine, Tomsk, Siberia, 1912; member of the Illinois State Medical Society; aged 60; died, July 7, of embolus and cerebral hemorrhage.

TONSILLECTOMY AND POLIOMYELITIS

Further evidence of the possible relationship between tonsil operations and infantile paralysis is contained in a report in *The Journal of the American Medical Association* for September 20 by Carl E. Krill, M.D., Akron, Ohio, and John A. Toomey, M.D., Cleveland, of the tragedy that recently struck a family at Akron.

"The presence of poliomyelitis (infantile paralysis) in epidemic form in various parts of the United States during this summer and fall, the obvious increase in the incidence of the bulbar type (affecting the respiratory muscles) of the disease and the suspected association between tonsillectomies and bulbar types of paralysis make the present preliminary report of general interest," the two physicians say.

"Five of six children, aged 11, 9, 8, 7, and 6 years, had a tonsillectomy and adenoidectomy (surgical removal of the tonsils and adenoids) on August 22. The operations were done under general anesthesia and under the strictest of aseptic (sterile) precautions in a clinic, and the children went home the same day in good condition. Three of the children began to show symptoms of poliomyelitis on September 3. One child probably started to have symptoms on the third and another on the fifth of September. All the symptoms were referred to the gastrointestinal tract — anorexia (loss of appetite), nausea and vomiting. Dysarthria (imperfect speech due to a disorder of the nervous system) and dysphagia (difficulty in swallowing) developed in 3 of the children on September 6 and in 2 the next day, so that by September 7 all 5 had bulbar poliomyelitis. In 2 there was involvement of the right seventh nerve and in 1 of the left (nerves of motion, secretion, etc., of the face, ear, palate and tongue). In 3 there was palatine (roof of the mouth) paralysis. In 1 child there was a lower motor neuron lesion (injury of certain nerve cells in the spinal column) involving muscles of the arms and legs, paralysis being more marked in the upper arms. One child died at 6:30 a. m. and 1 at 3:30 p. m. on September 8; a third died at 11:30 a. m. on September 9. One child appears as though he should get better, but the other is still seriously ill.

"The parents and the child of the family who was not operated on, who is the youngest of the children and 2½ years of age, have had no symptoms of the disease.

"Since the operations were performed under most sterile conditions and surroundings, it is unlikely that the disease was introduced at that time. This leaves two possibilities: (1) Poliomyelitis virus may have been present in the throats of these children at the time of the operation or (2) the virus was introduced after the operation. The time interval between the operations and the onset of symptoms — twelve days — makes one suspect that the virus was not present in the throats when the tonsils and adenoids were removed and that it probably was introduced later. Whether or not the virus is present in the stools of the child and the parents who are asymptomatic (lack of symptoms) remains to be ascertained by further study.

"There have been no cases of poliomyelitis in the neighborhood where this family lives. The only possible epidemiologic connection lies in the fact that from August 28 to September 2 the stricken children played with two other children who had been visiting some neighbors. The visiting children lived directly across the street from a patient who had died of bulbar poliomyelitis in Cleveland City Hospital on Aug. 4, 1941."

NAME IS CHANGED

A change in the spelling of the name "Petrolagar" to "Petrogalar" has been announced by the Petrolagar Laboratories. The change is being made in both the product name and corporate name.

Company officials, while pointing out that the adoption of the new spelling does not affect the formula or quality of the product in any way, said that they considered the change advisable to avoid any possible misconception as the nature of the product.

"Because it has never been the intention of the company to imply that agar-agar was used for any other purpose than as an emulsifying agent, the last syllable of the former name has been altered in favor of the new spelling," officials said.

Officials emphasized that no change has been made in the size of the package, price, or formulae and that each of the five different types of the product will carry the new spelling "Petrogalar." The new corporate name is: Petrogalar Laboratories, Inc., and the address remains, 8134 McCormick Boulevard, Chicago, Illinois.

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